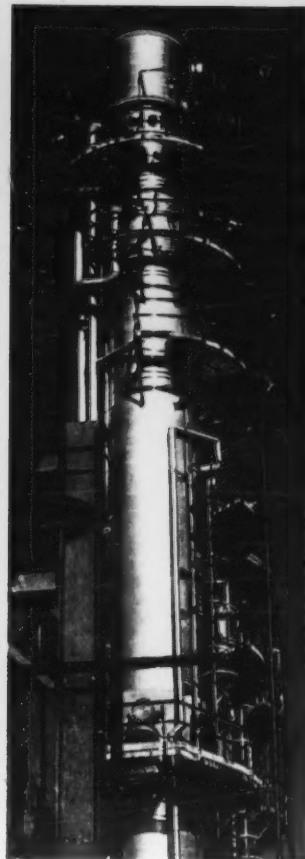


A2500-6U 1/90

Paper Paperboard Wood Pulp Capacity

1988-1991
with additional data for 1992
Fiber consumption



American Paper Institute
December 1989

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The American Paper Institute has conducted annual capacity surveys in the primary pulp and paper industry for the last thirty years. Over time, the scope of the surveys has expanded significantly and now includes responses from producers of more than 90% of total U.S. paper, paperboard and wood pulp.

The outline below is intended to clarify definitions and methodology and to assist the user in utilizing the capacity and raw materials data in the survey report.

- Capacity projects included in the survey are firm commitments. Such projects will usually be approved by senior management or boards of directors, have assured financing and, in many instances, will include site acquisition and signed contracts for machines or equipment.
- Published capacities for paper and paperboard represent potential for *primary finished production* before conversion into end products. Capacities for wood pulp are measured at a 10% moisture content. Consumption of pulp wood, recyclable paper and other fiber are "as received at mill".
- The definition of practical maximum capacity assumes normal operating conditions, full demand, adequate supplies of raw materials and available labor. The concept assumes that machines operate on an "all out" basis on their customary grade mix.
- Daily capacities are extrapolated to annual totals based on the maximum number of days each machine can operate in one year. Downtime, scheduled before the start of the year, other than due to lack of orders is excluded from capacity. Unscheduled downtime, is included. (Maximum operating days reported on pages 12 through 17 of this survey represent weighted averages of all machines in the industry).
- Capacity changes include the effect of

new machine installations, rebuilds, shutdowns, revised operating schedules, grade and basis weight changes or other modifications to existing facilities. Changes also include grade reallocations on "swing" machines which reflect intermediate or long-range market strategies and not short-term adjustments to market conditions which are often revised on a monthly basis.

- Capacities of "swing" or multiproduct machines are distributed on the basis of actual grade mix. For example, a swing machine in one year may be capable of producing 100,000 tons of unbleached kraft linerboard, if run exclusively on board, or 80,000 tons of unbleached kraft paper, if run exclusively on paper. If, in fact, the machine produces board for 75% of its operating year and paper for 25%, its capacity would be published as 75,000 tons of linerboard and 20,000 tons of paper. Planned changes in grade allocations (swings) in future years would be calculated in the same way.
- Capacities of dismantled or permanently inactive machines are removed from estimates immediately on shutdown. Capacities of other idled machines are removed after one year unless resumed operation is in prospect.
- Capacities of individual mills are directly related to verified levels of production.
- Edit procedures establish that types and quantities of fiber consumed in each mill are consistent with verified annual production.
- Inconsistencies in reported data are reconciled by direct contacts with company executives.
- Published capacities are grade totals summarized to regional and industry levels. Specific establishment data are not disclosed in the survey unless publicly announced by the respective companies.



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OVERVIEW

U.S. papermakers' expectations for long-term domestic and worldwide economic growth and the associated increasing demand for paper and paperboard products are being translated into plans for additional capacity. Nine new paper machines were brought into production in 1989 and at least twenty-three additional machines are scheduled to come on-stream over the next three years. These and other capacity additions should result in the U.S. paper industry maintaining its share of global capacity throughout the survey period.

After reaching a level of 80,533,000 tons annually in 1988, capacity for the manufacture of primary paper and paperboard increased by 1,911,000 tons this year to a total of 82,444,000 annual tons for 1989 as a whole. New capacity projects planned over the next three years are expected to add 8,633,000 additional tons to this base and should bring industry capacity to 91,077,000 tons annually in 1992. If these gains are fully realized, they will represent 10.5 million added tons in four years.

Increases in wood pulp capacity are also expected. During the three-year period 1990-1992, planned additions totaling 5,608,000 tons should increase total capacity from 64,288,000 tons in 1989 to 69,896,000 annual tons in 1992. These capacity gains will yield rates of growth averaging 3.4% annually for paper and paperboard and 2.8% annually for wood pulp over the three-year period.

In previous surveys, we have commented on the growing importance of waste paper as a furnish for papermaking. This survey demonstrates that this trend is continuing and accelerating.

Annual waste paper consumption is estimated to increase from 20,877,000 tons in 1989 to 24,983,000 tons in 1992 and usage is currently expected to grow nearly twice as fast as that of virgin fiber sources during the survey period. This pickup of growth, now expected to average 6.2% annually during the next three years, substantially exceeds the levels contemplated by producers one year ago and confirms the industry's publicly stated commitment to recycling. With the expected implementation of major recycling projects now in the final planning stages, even higher levels of consumption, including increased

utilization of lower quality paper wastes, can be expected in the future.

Significant increases in market pulp capacity, with 60% of production typically exported, are planned for the

three-year period 1990-1992. Capacity, measured at 9,091,000 annual tons in 1989, is estimated to increase at a rate averaging 4.5% annually to 10,382,000 annual tons in 1992. At this level, faci-

TABLE 1:
GROWTH TRENDS IN CAPACITY

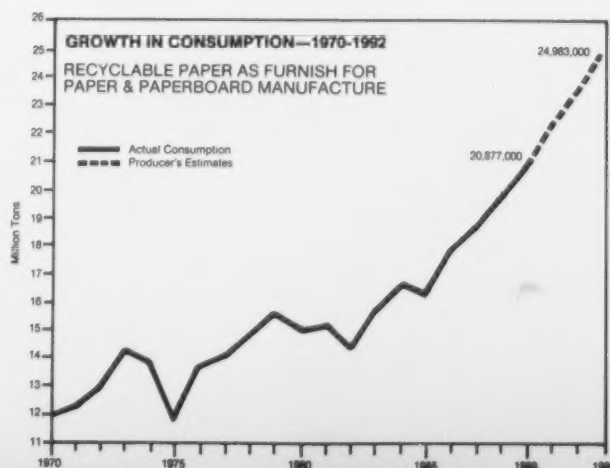
Thousands short tons

GRADES	ADDITIONS 1990-1992		ADDITIONS 1980-1989	
	3 YEAR INCREASE	AVERAGE ANNUAL GROWTH	10 YEAR INCREASE	AVERAGE ANNUAL GROWTH
TOTAL ALL GRADES PAPER & PAPERBOARD	8,653	3.3%	15,550	2.1%
TOTAL PAPER & PAPERBOARD	8,633	3.4	17,830	2.5
TOTAL PAPER	4,274	3.3	10,147	2.9
NEWSPRINT	1,001	5.1	2,081	4.1
PRINTING & WRITING	2,649	3.6	7,754	4.0
PACKAGING & IND. CONV.	185	1.1	(581)	(1.0)
TISSUE	441	2.5	892	1.7
TOTAL PAPERBOARD	4,357	3.4	7,683	2.1
UNBLEACHED KRAFT	2,382	3.7	5,321	3.0
SOLID BLEACHED	479	3.3	455	1.0
SEMICHEMICAL	303	1.7	1,053	2.0
RECYCLED	1,193	4.0	855	0.9
CONSTRUCTION GRADES	21	0.3	(2,280)	(7.0)

TOTAL ALL GRADES WOOD PULP	5,613	2.8%	11,443	2.0%
TOTAL WOOD PULP FOR PAPER & BOARD	5,608	2.8	12,651	2.2
DISSOLVING & SPECIAL ALPHA	—	—	(56)	(0.4)
SULFITE	3	0.1	(385)	(2.1)
SULFATE & SODA*	4,710	3.1	10,720	2.5
SEMICHEMICAL	102	0.7	312	0.7
MECHANICAL	794	3.8	2,059	3.8
WOOD PULP FOR CONSTRUCTION PAPER & BOARD	5	0.2	(1,208)	(8.8)

*Includes screenings

Not adjusted for rounding differences.



Note: Unless stated otherwise, all references to paper and paperboard and wood pulp exclude construction grades.

TABLE 2:
NEW PAPER & PAPERBOARD
CAPACITY 1990-1992

Thousands short tons

SOURCE OF CHANGE	3 YEAR INCREASE	
TOTAL INCREASE	8,633	100.0%
GREENFIELD MILLS	1,238	14.3
NEW MACHINES IN EXISTING MILLS	3,843	44.5
NET IMPROVEMENTS	3,552	41.2

TABLE 3:
ANNUAL CAPACITIES

Thousands short tons

YEAR	PAPER & PAPERBOARD			WOOD PULP		
	PERCENT INCREASE	CAPACITY ADDITIONS	ANNUAL CAPACITY	PERCENT INCREASE	CAPACITY ADDITIONS	ANNUAL CAPACITY
1970	—	—	53,260	—	—	43,505
1971	1.6	876	54,136	2.3	1,006	44,511
1972	3.2	1,737	55,873	2.3	1,029	45,540
1973	4.1	2,291	58,164	3.6	1,649	47,189
1974	2.3	1,363	59,527	1.0	448	47,637
1975	1.0	613	60,140	—	22	47,659
1976	1.9	1,167	61,307	2.3	1,100	48,759
1977	1.1	697	62,004	2.4	1,151	49,910
1978	1.8	1,087	63,091	(0.2)	(122)	49,788
1979	2.4	1,524	64,615	3.7	1,849	51,637
1980	2.7	1,753	66,368	3.1	1,578	53,215
1981	2.7	1,804	68,172	3.2	1,676	54,891
1982	2.8	1,914	70,086	2.2	1,234	56,125
1983	1.5	1,040	71,126	—	18	56,143
1984	2.8	1,972	73,098	2.8	1,599	57,742
1985	1.6	1,203	74,301	1.6	899	58,641
1986	2.0	1,476	75,777	1.9	1,109	59,750
1987	3.2	2,409	78,186	2.4	1,422	61,172
1988	3.0	2,347	80,533	2.9	1,778	62,950
1989E	2.4	1,911	82,444	2.1	1,338	64,288
1990E	3.1	2,557	85,001	2.7	1,760	66,048
1991E	3.7	3,181	88,182	3.5	2,288	68,336
1992E	3.3	2,895	91,077	2.3	1,560	69,896

E — Estimates

cellaneous improvements, less the capacities of facilities that have been dismantled or permanently taken out of production, will contribute the remaining 3,552,000 tons, or 41.2%, of the net gain.

GRADE HIGHLIGHTS

Projected capacity increases for individual grades of paper, paperboard and wood pulp are highlighted in Table 1. Comparisons include actual growth in capacity over the ten-year period 1980-1989 with estimated growth for the three future years 1990-1992.

- Continuing the trend reported in last year's survey, capacity for newsprint should continue to increase at a rate averaging 5.1% annually through 1992.
- Capacity for printing and writing papers is estimated to increase at an average 3.6% yearly rate, slightly below the long term 4% growth rate over the ten years 1980-1989. Almost 90% of these increases will be in capacity for uncoated free sheet and coated free sheet papers.
- In the tissue paper segment, four new paper machines, including two in greenfield mills, will add 441,000 annual tons of new capacity in the three-year period ending in 1992. These increases, which include facilities for the production of both household and industrial grades, will be 80% based on waste paper as a source of fiber.
- Producers of semichemical paperboard, almost all of which is utilized as corrugating medium for conversion into corrugated boxes, report capacity increases totaling 303,000 annual tons over the next three years. This reduced rate of expansion reflects plans to convert the product of a large paper machine from semichemical corrugating to recycled linerboard and, similarly, to reclassify the product of a second machine to recycled linerboard. Growth in capacity for total corrugating medium, both semichemical and recycled, is expected to increase at a rate averaging 2.2% annually.
- The dominant position of sulfate and soda pulps as the principal grade of wood pulp used in the manufacture of paper and paperboard will increase over the next three years. New capacity projects planned for these pulps, which now comprise 77% of total U.S. wood pulp capacity, should sustain an average annual growth rate of 3.1%. At this rate, these pulps will account for 84% of all new wood pulp capacity additions through 1992.

ties dedicated to the production of wood pulp for sale in the open market, will total 15% of all U.S. wood pulp capacity. These data exclude 2,356,000 annual tons of capacity dedicated to drying wood pulp for intercompany shipments and not available for public sale.

Table 2 shows the structural basis for increases in paper and paperboard capacity. New machine installations in existing mills will comprise the largest single component of growth and will contribute 3,843,000, or 44.5%, of all new capacity. New machine installations in greenfield mills will contribute 1,238,000 annual tons, or 14.3%, of the total. Machine rebuilds and other mis-

REGIONAL CAPACITY

The eight south central states increased share of paper and paperboard capacity from 26.8% in 1980 to 28.4% in 1988 and will account for 39.0% of all planned capacity growth through 1992. This region enjoys an even greater share of U.S. wood pulp capacity, which increased to 36.5% in 1988, and is expected to provide 47.8% of new additions over the 1988-1992 period. During the same four years, the north central states, with a 17.9% share of total paper and paperboard capacity in 1988, will provide 22.3% of all capacity gains. The northeastern and western states' share of paper, paperboard, and wood pulp capacity will decrease during this period.

RAW MATERIAL

Table 5 (on page 6) shows consumption of wood pulp, recyclable paper and other fibrous materials as furnish for papermaking has increased by 3.0% in 1988 to reach a record level of 79,660,000 tons. This increase is consistent with the 2.8% increase in production of primary paper and paperboard which totaled 76,403,000 tons in 1988. Estimates of future fiber consumption, which reflect producers' plans to expand manufacturing capacity, also assume operation at full capacity levels, and project a 3.6% annual increase with consumption reaching 91,915,000 tons in 1992. Recyclable paper will continue to increase as a percent of total fiber consumption and, at a 5.9% annual rate of increase, usage should total 24,983,000 tons in 1992, an increase of 5,096,000 tons per year over 1988 consumption. In 1992, secondary materials will comprise 56.1% of total fiber consumption compared with 55.1% in 1988. Between 1988 and 1992, waste paper's share of total fiber consumption will grow from 24.9% by 2.3 percentage points, an 8.5% share gain, and in 1992 will constitute 27.2% of the industry's fiber requirements.

PAPER GRADES

Newsprint

U.S. newsprint capacity, which stood at 6,115,000 annual tons in 1988, will increase to 6,280,000 tons in 1989 and is now expected to reach an annual level of 7,281,000 annual tons in 1992. This growth continues the trend reported in last year's survey and reflects the contributions of three new paper machines scheduled to come on-stream in 1989,

plus two additional machines planned for 1990 and 1991.

The survey includes a new paper machine and deinking facility designed to recycle old newspapers. This project signals an acceleration toward greater recycling in the newsprint industry. Additional recycling projects, now under study, are expected to augment this trend.

Additionally, the Canadian Pulp and Paper Association's April 1989 Capacity Report, projects the addition of 1,631,000 tons of newsprint capacity in Canadian mills increasing the total capacity to 12,748,000 tons in 1991. This will represent an annual growth rate averaging 4.7% per year over that period.

Printing and Writing Papers

Seven new paper machines, four dedicated to uncoated free sheet and three to coated free sheet grades, are now under construction and are scheduled to be brought into production in 1990 and 1991. In the three-year period 1990 through 1992, capacity for uncoated free sheet is estimated to increase by

**TABLE 4:
REGIONAL CAPACITY DISTRIBUTION PERCENT OF TOTAL**

REGIONS	PAPER & PAPERBOARD			WOOD PULP		
	SHARE OF U.S. TOTAL		SHARE OF CAPACITY INCREASE	SHARE OF U.S. TOTAL		SHARE OF CAPACITY INCREASE
	1980	1988		1980	1988	
NORTHEAST	17.1	14.4	5.6	8.3	7.7	2.5
NORTH CENTRAL	17.7	17.9	22.3	7.1	7.4	7.9
SOUTHEAST	24.3	24.5	20.3	31.8	31.5	32.6
SOUTH CENTRAL	26.8	28.4	39.0	35.5	36.5	47.8
WEST	14.1	14.8	12.8	17.3	16.9	9.2

1,314,000 annual tons while capacity for coated free sheet should increase by 1,060,000 annual tons. Annual rates of growth in capacity should average 3.5% and 8.8% respectively.

Despite the strong anticipated gains, capacity for both of these printing and writing grades is now expected to be below the estimated levels for 1991 reported in our survey last year.

Packaging and Industrial Converting Papers

A recently completed review of end uses for packaging and industrial converting papers has resulted in the reclassification, in the 1988 base year of this survey, of 275,000 tons of unbleached kraft paper and 75,000 tons of

bleached packaging paper. These capacities are now included with special industrial papers and specialty packaging papers. This reclassification, which results from a study involving all major producers of these products, is intended to provide a clear distinction between commodity and specialty grades and should add an improved market dimension to API statistical reports.

After accounting for these reclassifications, which have also been included in our historical data series, capacity for packaging and industrial converting papers, as a whole, is estimated to grow at a 1.1% annual average rate through 1992.

PAPERBOARD GRADES

Unbleached Kraft Paperboard

Producers of unbleached kraft paperboard report expansion projects which, in aggregate, will add 2,382,000 tons of new capacity over the next three years to the 1989 industry level of 20,867,000 tons. Unbleached kraft linerboard, the major product in this category, is estimated to increase by 2,085,000 tons at a rate averaging 3.5% annually. Unbleached kraft folding paperboard, a considerably smaller industry segment, should increase by 297,000 tons at a higher rate of growth averaging 7.9% per year. These rates of increase in capacity roughly approximate producers' estimates reported in our survey last year. For unbleached kraft paperboard as a whole, improvement to existing plant will provide 52% of the total increase and four new paperboard machines, two of which will replace existing but smaller machines, will supply the remaining 48% of the total increase in capacity.

Solid Bleached Paperboard

A new 220,000 ton per year machine, earmarked for the production of solid bleached paperboard for food packaging, is scheduled for start-up in 1992. This will be the first major new machine installation for these grades since 1986. While the full capacity of this machine is not captured in the 1992 data, the last year in this survey, it will contribute, together with other expansion projects, to an overall increase in capacity of 479,000 annual tons over the next three years. Total capacity for bleached kraft paperboard is estimated at 5,202,000 tons annually in 1992.

Recycled Paperboard

Broadly, recycled paperboard is comprised of boxboard grades, containerboard grades, and also of gypsum wallboard facing. Producers of recycled boxboard have experienced market conditions which, over the past twenty years, have required them to remove from production manufacturing facilities capable of producing almost three million tons per year. These conditions have also constrained net new growth in capacity which has averaged less than 1% per year over the period.

In recent years, however, technological innovations and a growing national concern with the disposal of solid wastes have combined to provide an economic basis for the revitalization of the recycled paperboard segment. The projected increase in capacity for three future years for recycled paperboard has more than doubled compared to that reported last year. Over the next three years, companies which now produce recycled paperboard, as well as new entrants into the industry, plan ex-

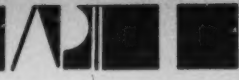
TABLE 5:
FIBER SOURCES FOR PAPER & PAPERBOARD MANUFACTURE

Thousands short tons

GRADES	1988		1989	1990	1991	1992		AVERAGE ANNUAL GROWTH 1988-1992
	ANNUAL TONS	PERCENT	ANNUAL TONS	ANNUAL TONS	ANNUAL TONS	ANNUAL TONS	PERCENT	
TOTAL CONSUMPTION	79,660	100.0	82,223	85,574	89,215	91,915	100.0	3.6%
PRIMARY MATERIALS								
WOOD PULP FROM PRIMARY FIBERS	35,756	44.9	36,940	37,994	39,206	40,355	43.9	3.1
SECONDARY MATERIALS	43,904	55.1	45,283	47,581	50,008	51,561	56.1	4.1
WOOD PULP FROM SECONDARY FIBERS	23,640	29.7	24,017	24,599	25,813	26,128	28.4	2.5
RECYCLABLE PAPER*	19,887	24.9	20,877	22,568	23,739	24,983	27.2	5.9
OTHER	377	0.5	389	414	456	450	0.5	4.5

Note: Consumption for 1990-1992 assumes capacity levels of production.

*Includes the following tonnage consumed in the manufacture of molded pulp products: 1988, 203,000 tons; 1989, 212,000 tons; 1990-1992, 225,000 tons.



pansions that will add 1,193,000 annual tons to the 1989 base of 9,612,000 tons. Containerboard grades will account for three quarters, or 944,000 tons, of the new capacity with recycled linerboard expected to more than double from 455,000 annual tons in 1989 to 1,169,000 annual tons in 1992.

Capacity for recycled corrugating medium should increase during these years by 11.3%, or 230,000 annual tons. For the first time in this survey, waste paper consumed in the production of recycled corrugating medium is reported separately from other grades of recycled paperboard.

Additional expansion projects for recycled paper and paperboard are under serious study and further expansions are likely.

WOOD PULP GRADES

Chemical Paper Grade Pulps

Planned capacity increases in chemical paper grade pulps for the next three years total 4,713,000 annual tons for the years and capacity should grow by 9.2%, from 51,291,000 tons annually in 1989, to 56,004,000 tons in 1992. The entire gain in capacity will be in sulfate and soda pulps with 70% of the increase allocated to bleached grades, utilized in printing and writing papers and food packaging, and 30% to unbleached grades, which find end uses in containerboard and other packaging products. Capacities for sulfite pulp and for dissolving and special alpha pulp, a grade not included in the paper grade category, are not expected to change over the survey period.

Mechanical Pulp

Since the introduction of thermomechanical pulp into U.S. mills in 1975, new capacity has been added at a

faster rate than any other grade of wood pulp. This trend is estimated to continue during this survey period and, over the next three years, capacity is reported to increase by 573,000 annual tons, at a rate of increase averaging 5.6% annually. By 1992, thermomechanical pulp capacity will total 3,804,000 annual tons and is expected to comprise 51.2% of all mechanical grades.

Market Pulps

Throughout the 1980's, growth in capacity for bleached sulfate market pulp, which comprises close to 80% of all market pulp grades, has grown more rapidly than total wood pulp capacity. Capacity, which stood at 4,589,000 annual tons in 1980, has increased an average of 5.1% annually and should reach 7,151,000 tons this year. A continuation of this growth rate, averaging 5.6% per year, is reported for the three years in this survey, 1990-1992. Planned capacity additions of 1,267,000 annual tons during these years should lead to an industry total of 8,418,000 tons in 1992.

SUMMARY

The expansion plans highlighted here and detailed throughout this year's Capacity Survey should culminate in an additional 8.6 million tons of new capacity being brought on-stream during the first three years of the nineties. While most of the tonnage gains are concentrated in the printing and writing and unbleached kraft grades, important advances are nonetheless underway throughout the industry. These plans, taken as a whole, reflect the long-term commitments of U.S. pulp, paper and paperboard producers to remain world-class participants in both domestic and global paper markets.

Richard E. Storat
Vice President

December 1989

Paper & Paperboard

Practical Maximum Basis
Thousands short tons

GRADES	1988	1989	1990	1991	1992*
Total All Grades	82,663	84,583	87,148	90,340	93,236
TOTAL PAPER & PAPERBOARD	80,533	82,444	85,001	88,182	91,077
Total Paper	40,211	41,326	42,649	44,342	45,600
NEWSPRINT	6,115	6,280	6,808	7,123	7,281
PRINTING WRITING & RELATED	23,027	23,811	24,393	25,492	26,460
Uncoated Groundwood	1,735	1,846	1,808	1,877	1,905
Coated Groundwood	4,347	4,467	4,607	4,621	4,668
Coated Free Sheet	3,436	3,675	3,892	4,282	4,735
Uncoated Free Sheet	11,853	12,149	12,403	13,022	13,463
Cotton Fiber	203	205	210	212	212
Thin Papers	282	287	288	288	289
Solid Bleached Bristols	1,171	1,183	1,185	1,188	1,188
PACKAGING & IND. CONV.	5,402	5,472	5,475	5,600	5,657
Unbleached Kraft	2,908	2,854	2,871	2,889	2,905
Bleached Packaging & Ind. Conv.	439	466	429	442	444
Specialty Packaging	638	657	660	709	722
Special Industrial	1,417	1,495	1,515	1,559	1,587
TISSUE	5,667	5,762	5,972	6,127	6,203
Total Paperboard	40,322	41,119	42,352	43,840	45,476
UNBLEACHED KRAFT	20,269	20,867	21,482	22,409	23,249
of which Kraft Linerboard	18,705	19,195	19,781	20,543	21,280
SOLID BLEACHED	4,733	4,723	4,838	5,051	5,202
SEMICHEMICAL	5,788	5,917	6,003	6,010	6,220
RECYCLED	9,532	9,612	10,029	10,370	10,805
Construction Paper & Board and Other	2,130	2,139	2,148	2,159	2,160

*Capacity additions presented here for 1992 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

Totals not adjusted for rounding differences.

capacity
summary
annual

paper and paperboard mills and machines shut down

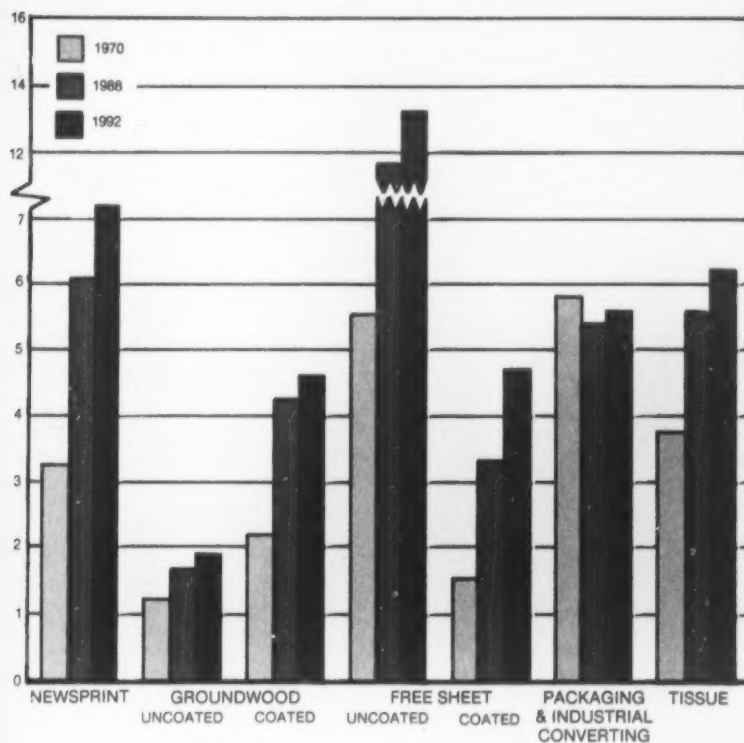
Grades	1971-1975			1976-1980		
	Number of Machines	Number of Complete Mills	Annual Capacity	Number of Machines	Number of Complete Mills	Annual Capacity
TOTAL	135	39	2,482	163	53	3,990
Paper						
Newsprint	—	—	—	3	1	231
Printing, Writing & Related	51	8	803	32	5	550
Pkg. & Ind. Conv.	35	8	290	32	7	395
Tissue	6	4	52	25	8	246
Paperboard						
Unbleached Kraft	2	—	128	2	1	400
Solid Bleached	1	—	33	2	1	162
Semichemical	3	1	123	4	1	178
Recycled	29	14	872	35	12	1,295
Construction Paper & Board & Other	8	4	181	28	17	533

capacity
reductions

capacity/annual growth comparison

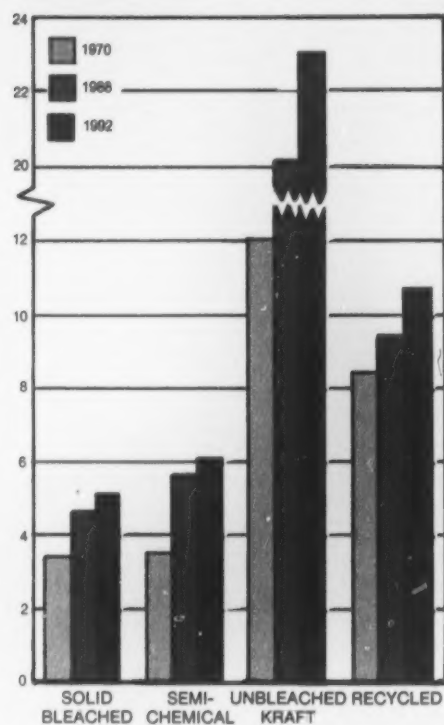
PAPER

Millions short tons



PAPERBOARD

Millions short tons



Thousands short tons

Grades	1981-1985*			1986-1992*			
	Number of Machines	Number of Complete Mills	Annual Capacity	Number of Machines	Number of Complete Mills	Annual Capacity Removed from Survey	Annual Capacity Not Removed from Survey
TOTAL	222	88	6,228	66	13	2,465	87
Paper							
Newsprint	5	—	360	—	—	—	—
Printing, Writing & Related	38	4	771	24	2	437	17
Pkg. & Ind. Conv.	31	7	821	13	3	545	—
Tissue	30	13	308	10	3	51	35
Paperboard							
Unbleached Kraft	5	—	742	4	—	787	—
Solid Bleached	—	—	—	2	—	142	—
Semichemical	7	2	553	3	—	360	—
Recycled	18	12	644	7	3	118	35
Construction Paper & Board & Other	88	50	2,029	3	2	25	—

Shutdowns represent machines and mills reported to the API as permanent or indefinite closures and have been removed from capacity totals. Not all of the facilities have been dismantled and some portion of their productive capacity could be restored.

*Includes machines converted to produce other grades.

Wood Pulp

capacity
summary
annual

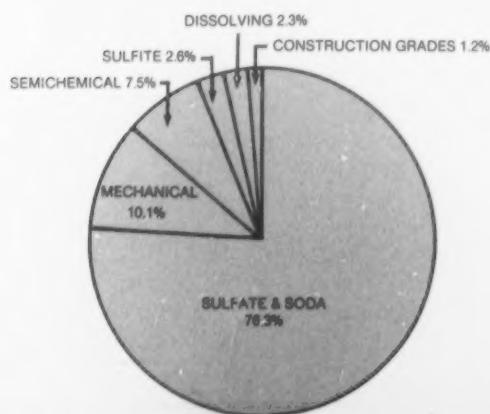
Practical Maximum Basis Thousands short tons					
GRADES	1988	1989	1990	1991	1992*
Total All Grades Wood Pulp	63,754	65,079	66,840	69,131	70,692
TOTAL WOOD PULP FOR PAPER & BOARD	62,950	64,288	66,048	68,336	69,896
DISSOLVING	1,450	1,495	1,495	1,495	1,495
CHEMICAL PAPER GRADES	50,277	51,291	52,518	54,510	56,004
SULFITE PAPER GRADES	1,627	1,619	1,622	1,622	1,622
SULFATE & SODA PAPER GRADES	48,650	49,672	50,896	52,888	54,382
Bleached & Semibleached Softwood	14,056	14,347	14,674	15,264	15,964
Bleached & Semibleached Hardwood	12,450	12,844	13,202	13,953	14,538
Unbleached	22,145	22,481	23,020	23,671	23,880
SEMICHEMICAL	4,787	4,865	4,925	4,964	4,967
MECHANICAL	6,432	6,632	7,105	7,363	7,426
SCREENINGS	4	4	4	4	4
Wood Pulp for Construction Paper & Board†	804	791	792	795	796

TOTAL MACHINE DRIED WOOD PULP	11,219	11,379	11,588	12,056	12,738
DISSOLVING	1,450	1,495	1,495	1,495	1,495
CHEMICAL PAPER GRADES	9,607	9,720	9,919	10,381	11,056
SULFITE PAPER GRADES	455	484	484	484	484
SULFATE & SODA PAPER GRADES	9,152	9,236	9,435	9,896	10,571
Bleached & Semibleached Softwood	5,495	5,504	5,705	6,046	6,571
Bleached & Semibleached Hardwood	3,461	3,516	3,514	3,634	3,785
Unbleached	196	216	216	216	216
ALL OTHER	162	164	174	181	188

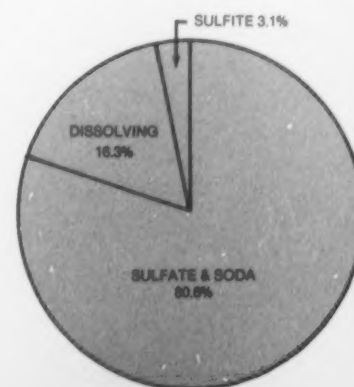
*Capacity additions presented here for 1992 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

†Excludes the debarked/exploded pulp capacity of mills that produce hard pressed board.

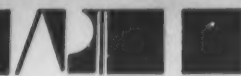
Totals not adjusted for rounding differences.



**TOTAL WOOD PULP
GRADE DISTRIBUTION
1988**

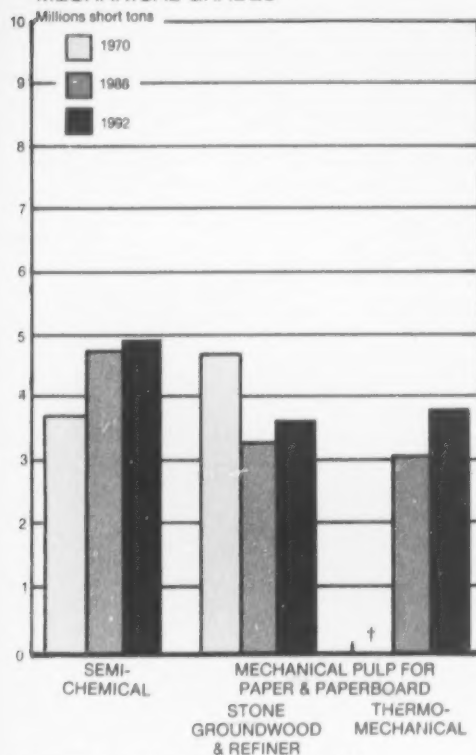


**MARKET WOOD PULP
GRADE DISTRIBUTION
1988**



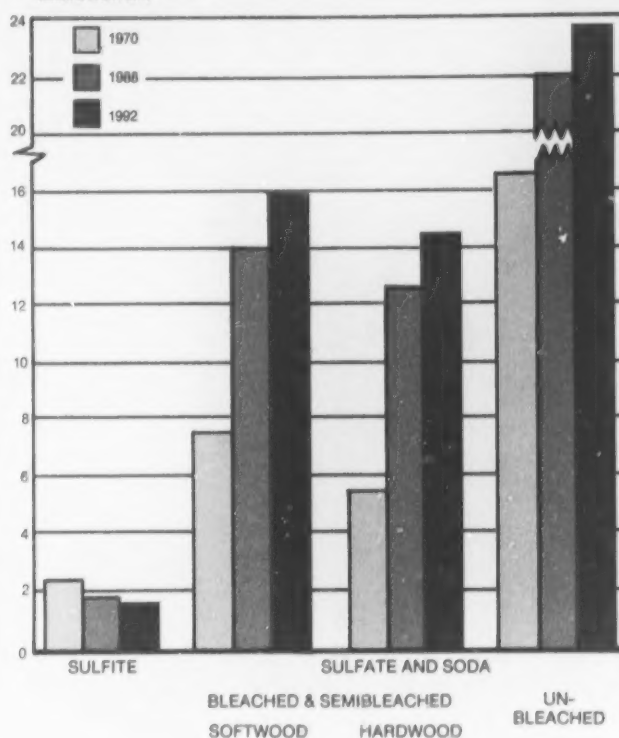
capacity/annual growth comparison

WOOD PULP SEMICHIMICAL & MECHANICAL GRADES



WOOD PULP CHEMICAL PAPER GRADES

Millions short tons



market wood pulp

Practical Maximum Basis
Thousands short tons

GRADES	1988	1989	1990	1991	1992*
TOTAL MARKET WOOD PULP	8,908	9,091	9,335	9,742	10,382
DISSOLVING	1,450	1,495	1,495	1,495	1,495
CHEMICAL PAPER GRADES	7,451	7,592	7,826	8,226	8,859
SULFITE PAPER GRADES	273	252	252	252	252
SULFATE & SODA PAPER GRADES	7,178	7,341	7,574	7,975	8,607
Bleached & Semibleached Softwood	4,082	4,176	4,378	4,661	5,159
Bleached & Semibleached Hardwood	2,909	2,975	3,007	3,124	3,259
Unbleached	187	190	190	190	190
ALL OTHER	7	4	14	21	28

Based on information provided by producers. Reflects diversion of drying capacity to and from own use, installation of new equipment and retirement of existing equipment.

*Capacity additions presented here for 1992 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

Totals not adjusted for rounding differences.

capacity
summary
annual

Paper By Grade

capacity/annual • year end • daily

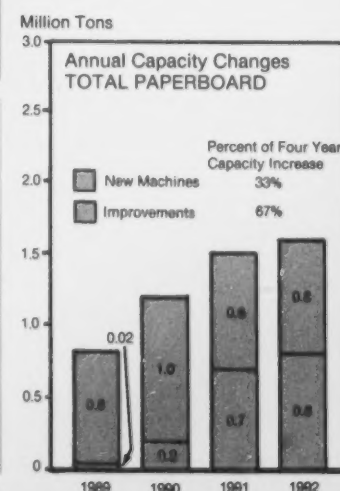
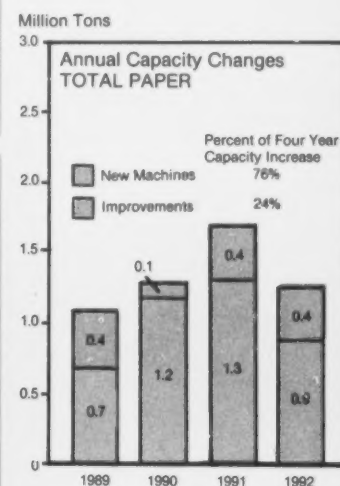
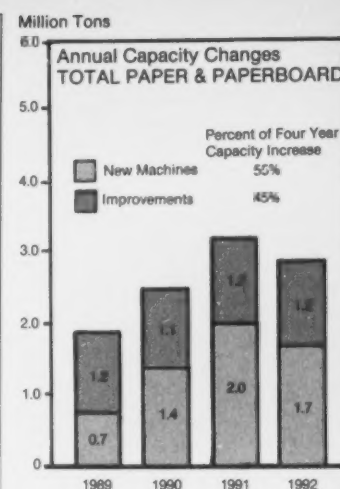
	ALL GRADES PAPER & PAPER-BOARD Total	PAPER & PAPER-BOARD Total	Practical Maximum Basis Thousands short tons	PAPER Total	NEWS-PRINT Total	Total	Uncoated Ground-wood	Coated Ground-wood	Coated Free Sheet
ANNUAL CAPACITY 1988-1992	82,663	80,533	1988 Annual Capacity	40,211	6,115	23,027	1,735	4,347	3,436
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	713 1,207 84,583 1,416 1,150 87,148 1,989 1,204 90,340 1,676 1,219 93,236	713 1,198 82,444 1,416 1,141 85,001 1,989 1,192 88,182 1,676 1,218 91,077	New Machines Net Improvements 1989 Annual Capacity New Machines Net Improvements 1990 Annual Capacity New Machines Net Improvements 1991 Annual Capacity New Machines Net Improvements 1992* Annual Capacity	694 420 41,326 1,193 130 42,649 1,310 383 44,342 873 386 45,600	122 43 6,280 491 37 6,808 285 29 7,123 135 22 7,281	473 312 23,811 476 106 24,393 771 328 25,492 662 306 26,460	55 55 1,846 14 (52) 1,808 — 69 1,877 — 27 1,905	38 82 4,467 158 (18) 4,607 20 (6) 4,621 7 40 4,668	203 37 3,675 158 59 3,892 262 128 4,282 305 147 4,735
YEAR END CAPACITY 1988-1992	83,833	81,888	1988 Year End Capacity	40,929	6,144	23,587	1,814	4,421	3,619
Year End Capacity is calculated by multiplying Daily Rate by number of Available Days	1,182 672 85,687 1,522 1,540 88,748 2,217 891 91,856 1,370 1,084 94,310	1,182 678 83,548 1,522 1,530 86,600 2,217 880 89,696 1,370 1,084 92,150	New Machines Net Improvements 1989 Year End Capacity New Machines Net Improvements 1990 Year End Capacity New Machines Net Improvements 1991 Year End Capacity New Machines Net Improvements 1992* Year End Capacity	1,091 — 42,021 1,043 333 43,397 1,426 366 45,190 372 355 45,917	454 54 6,652 355 (4) 7,003 205 34 7,242 73 46 7,361	470 (28) 24,030 432 301 24,762 1,054 317 26,133 299 258 26,690	53 (71) 1,795 — 42 1,837 — 64 1,901 — 4 1,905	191 (28) 4,584 25 4 4,613 — 28 4,641 110 32 4,782	116 (65) 3,670 212 170 4,051 435 94 4,560 66 151 4,797
YEAR END DAILY RATE 1988-1992	355 236.13	356 229.31	1988 Available Days Daily Rate	358 114.40	361 17.01	358 65.84	360 5.04	359 12.30	360 10.06
	355 241.61	356 234.79	1989 Available Days Daily Rate	357 117.65	360 18.47	358 67.17	360 4.98	359 12.76	359 10.23
	355 250.19	356 243.34	1990 Available Days Daily Rate	357 121.51	360 19.45	358 69.22	360 5.10	359 12.84	359 11.30
	355 258.87	356 251.99	1991 Available Days Daily Rate	357 126.51	360 20.11	358 73.04	360 5.27	359 12.92	358 12.79
	355 265.72	356 258.84	1992* Available Days Daily Rate	357 128.52	360 20.44	358 74.58	360 5.29	359 13.31	358 13.39

*Capacity additions presented here for 1992 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.



PRINTING, WRITING & RELATED				PACKAGING & INDUSTRIAL CONVERTING					TISSUE
Uncoated Free Sheet	Cotton Fiber	Thin Papers	Solid Bleached Bristols	Total	Un-bleached Kraft	Bleached Packaging & Industrial Converting	Specialty Packaging	Special Industrial	Total
11,853	203	282	1,171	5,402	2,908	439	638	1,417	5,667
177	—	—	—	2	—	—	—	2	96
119	2	5	12	68	(54)	28	19	76	(2)
12,149	205	287	1,183	5,472	2,854	466	657	1,495	5,762
143	3	—	—	36	29	—	3	4	190
111	2	1	2	(34)	(13)	(37)	—	16	21
12,403	210	288	1,185	5,475	2,871	429	660	1,515	5,972
488	—	—	—	137	71	—	47	20	117
131	2	—	4	(12)	(52)	13	3	24	38
13,022	212	288	1,188	5,600	2,889	442	709	1,559	6,127
349	—	—	—	20	5	—	3	13	56
91	—	1	—	36	10	1	11	14	20
13,463	212	289	1,188	5,657	2,905	444	722	1,587	6,203
12,062	204	284	1,184	5,442	2,881	457	643	1,482	5,757
107	4	—	—	7	—	—	—	7	160
131	1	4	—	(18)	(41)	(27)	15	35	(8)
12,300	208	288	1,184	5,431	2,840	429	658	1,504	5,908
195	—	—	—	130	88	—	42	—	127
77	4	—	4	18	2	—	(1)	17	18
12,573	212	288	1,188	5,578	2,829	429	669	1,521	6,053
620	—	—	—	60	18	—	10	33	107
131	—	—	—	(10)	(61)	14	7	30	26
13,324	212	288	1,188	5,628	2,886	444	716	1,583	6,186
123	—	—	—	—	—	—	—	—	—
70	—	1	—	32	21	—	7	5	18
13,517	212	289	1,188	5,661	2,906	444	723	1,586	6,204
358	320	340	361	354	357	359	353	345	356
33.68	.64	.84	3.28	15.39	8.06	1.27	1.82	4.23	16.17
357	322	340	360	353	357	358	352	345	355
34.41	.65	.85	3.29	15.38	7.96	1.20	1.87	4.36	16.63
357	322	340	360	353	357	358	352	345	355
35.18	.66	.85	3.30	15.80	8.22	1.20	1.98	4.41	17.04
358	322	340	360	353	356	358	352	346	355
37.25	.66	.85	3.30	15.95	8.10	1.24	2.03	4.58	17.41
358	322	340	360	353	356	358	352	346	355
37.79	.66	.85	3.30	16.04	8.16	1.24	2.05	4.59	17.48

Totals not adjusted for rounding differences

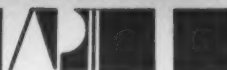


Paperboard By Grade

capacity/annual • year end • daily

	Practical Maximum Basis	Thousands short tons	PAPER- BOARD Total	UNBLEACHED KRAFT PAPERBOARD			SOLID BLEACHED PACKAGING PAPERBOARD						
				Total	Liner- board	Folding	Other	Total	Liner- board	Folding	Milk Carton & Food Service	Other	
ANNUAL CAPACITY 1988-1992 Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	1988	Annual Capacity	40,322	20,269	18,705	1,055	509	4,733	170	2,323	2,017	222	
		New Machines	20	—	—	—	—	—	—	—	—	—	—
		Net Improvements	777	598	489	97	12	(10)	15	(30)	(12)	17	—
	1989	Annual Capacity	41,119	20,867	19,195	1,151	521	4,723	185	2,293	2,006	239	
		New Machines	222	120	106	14	—	—	—	—	—	—	—
		Net Improvements	1,011	495	480	14	—	115	10	87	17	1	—
	1990	Annual Capacity	42,352	21,482	19,781	1,180	521	4,838	195	2,380	2,023	240	
		New Machines	678	653	505	148	—	—	—	—	—	—	—
		Net Improvements	809	274	258	17	—	213	2	125	86	—	—
	1991	Annual Capacity	43,840	22,409	20,543	1,344	521	5,051	197	2,506	2,108	240	
	New Machines	804	370	307	63	—	87	—	87	—	—	—	
	Net Improvements	833	470	429	40	—	64	—	41	23	—	—	
1992*	Annual Capacity	45,476	23,249	21,280	1,448	521	5,202	197	2,634	2,132	240		
YEAR END CAPACITY 1988-1992 Year End Capacity is calculated by multiplying Daily Rate by number of Available Days	1988	Year End Capacity	40,759	20,630	19,026	1,086	519	4,738	184	2,308	2,009	236	
		New Machines	91	—	—	—	—	—	—	—	—	—	—
		Net Improvements	677	485	401	81	3	(21)	(8)	21	(36)	2	—
	1989	Year End Capacity	41,527	21,115	19,427	1,167	521	4,717	176	2,329	1,973	239	
		New Machines	479	436	365	71	—	—	—	—	—	—	—
		Net Improvements	1,197	504	505	(2)	—	252	20	135	95	1	—
	1990	Year End Capacity	43,203	22,055	20,297	1,236	521	4,969	197	2,464	2,068	240	
		New Machines	790	577	453	124	—	—	—	—	—	—	—
		Net Improvements	513	77	58	18	—	119	—	56	63	—	—
	1991	Year End Capacity	44,507	22,709	20,809	1,379	521	5,088	197	2,520	2,131	240	
	New Machines	998	534	459	75	—	218	—	218	—	—	—	
	Net Improvements	729	408	366	42	—	43	—	42	—	—	—	
1992*	Year End Capacity	46,234	23,651	21,634	1,496	521	5,349	197	2,781	2,132	240		
YEAR END DAILY RATE 1988-1992	1988	Available Days	355	357	357	353	360	361	357	362	360	361	
		Daily Rate	114.91	57.79	53.27	3.08	1.44	13.13	.52	6.38	5.58	.65	
	1989	Available Days	355	357	357	353	359	360	359	360	359	361	
		Daily Rate	117.13	59.20	54.44	3.30	1.45	13.11	.49	6.47	5.49	.66	
	1990	Available Days	355	357	357	354	359	360	358	360	360	361	
		Daily Rate	121.83	61.84	56.88	3.50	1.45	13.80	.55	6.84	5.75	.66	
	1991	Available Days	355	357	357	354	359	360	358	360	359	361	
		Daily Rate	125.48	63.67	58.31	3.90	1.45	14.14	.55	7.00	5.93	.66	
	1992*	Available Days	355	357	357	354	359	360	358	361	359	361	
		Daily Rate	130.32	66.31	60.62	4.23	1.45	14.86	.55	7.71	5.93	.66	

*Capacity additions presented here for 1992 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.



Construction Paper & Board by Grade

	SEMI-CHEMICAL PAPER-BOARD	RECYCLED PAPERBOARD							
		Total	Liner-board	Corru- gating Medium	Container Chip & Filler	Folding	Set-up	Gypsum Wall Board Facing	Other
	5,788	9,532	494	1,947	35	2,601	288	1,411	2,756
	—	20	—	5	—	3	—	—	12
	129	60	(40)	89	1	(45)	14	(6)	47
	5,917	9,612	455	2,040	36	2,558	301	1,405	2,816
	—	102	—	30	—	12	—	—	60
	86	315	103	127	—	63	4	—	18
	6,003	10,029	558	2,197	36	2,634	305	1,405	2,894
	—	25	14	—	—	—	—	—	11
	7	315	222	39	—	34	3	—	17
	6,010	10,370	794	2,236	36	2,668	308	1,405	2,922
	—	346	336	10	—	—	—	—	—
	210	89	40	24	—	12	2	—	12
	6,220	10,805	1,169	2,270	36	2,680	310	1,405	2,934

CONSTRUCTION PAPER & BOARD & WET MACHINE BOARD			
Total	Construction Paper	Wet Machine Board	Insulating Board
2,130	830	121	1,179
—	—	—	—
9	2	—	7
2,139	832	121	1,186
—	—	—	—
9	9	—	—
2,148	841	121	1,186
—	—	—	—
11	11	—	—
2,159	852	121	1,186
—	—	—	—
1	1	—	—
2,160	853	121	1,186

5,854	9,537	446	2,006	36	2,556	296	1,406	2,791	
—	91	—	35	—	14	—	—	42	
74	139	38	67	—	11	7	(1)	18	
5,928	9,767	484	2,107	36	2,580	303	1,405	2,851	
—	42	—	—	—	2	—	—	40	
122	319	106	112	—	78	4	—	20	
6,050	10,129	589	2,219	36	2,660	307	1,405	2,912	
—	213	213	—	—	—	—	—	—	
48	269	207	35	—	13	1	—	12	
6,098	10,611	1,010	2,255	36	2,673	309	1,405	2,923	
—	246	228	18	—	—	—	—	—	
209	69	33	11	—	11	1	—	13	
6,308	10,926	1,271	2,283	36	2,684	310	1,405	2,937	

2,145	834	121	1,190
—	—	—	—
(6)	(1)	—	(5)
2,139	832	121	1,186
—	—	—	—
9	9	—	—
2,148	842	121	1,186
—	—	—	—
11	11	—	—
2,160	853	121	1,186
—	—	—	—
—	—	—	—
2,160	853	121	1,186

356	346	355	353	345	347	338	338	344	
16.42	27.57	1.26	5.68	.10	7.37	.88	4.16	8.12	
357	346	356	352	345	347	338	338	344	
16.60	28.23	1.36	5.98	.10	7.43	.90	4.16	8.29	
357	346	357	352	345	347	339	338	344	
16.94	29.24	1.65	6.30	.10	7.66	.91	4.16	8.46	
357	347	358	352	345	347	339	338	344	
17.09	30.59	2.82	6.40	.10	7.70	.91	4.16	8.49	
357	347	357	352	345	347	339	338	344	
17.68	31.48	3.56	6.48	.10	7.73	.92	4.16	8.53	

314	333	294	304
6.82	2.50	.41	3.91
314	333	294	303
6.82	2.50	.41	3.91
314	333	294	303
6.85	2.53	.41	3.91
314	333	294	303
6.88	2.56	.41	3.91
314	333	294	303
6.88	2.56	.41	3.91

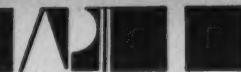
Totals not adjusted for rounding differences.

Wood Pulp By Grade

capacity/annual • year end • daily — for paper & paperboard

		Practical Maximum Basis Thousands short tons	ALL GRADES WOOD PULP	WOOD PULP FOR PAPER & BOARD	DISSOL- VING	CHEMICAL PAPER GRADES					
						SULFITE			SULFATE		
						Total	Bleached	Unbleached	Total	Bleach Semible	
											Hardwood
ANNUAL CAPACITY 1988-1992	1988	Annual Capacity	63,754	62,950	1,450	50,277	1,627	1,442	185	48,650	12,450
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective		New Machines	271	271	—	120	—	—	—	120	120
		Net Improvements	1,054	1,067	45	894	(7)	(11)	4	901	274
	1989	Annual Capacity	65,079	64,288	1,495	51,291	1619	1,430	189	49,672	12,844
		New Machines	1,397	1,397	—	874	—	—	—	874	207
		Net Improvements	363	362	—	353	2	2	—	350	151
	1990	Annual Capacity	66,840	66,048	1,495	52,518	1,622	1,433	189	50,896	13,202
		New Machines	1,740	1,740	—	1,515	—	—	—	1,515	608
		Net Improvements	551	549	—	477	—	—	—	477	143
	1991	Annual Capacity	69,131	68,336	1,495	54,510	1,622	1,433	189	52,888	13,953
		New Machines	999	999	—	993	—	—	—	993	422
		Net Improvements	562	561	—	500	—	—	—	500	162
	1992*	Annual Capacity	70,692	69,896	1,495	56,004	1,622	1,433	189	54,382	14,538
YEAR END CAPACITY 1988-1992	1988	Year End Capacity	64,471	63,680	1,495	50,851	1,622	1,433	189	49,228	12,729
Year End Capacity is calculated by multiplying Daily Rate by number of Available Days		New Machines	474	474	—	—	—	—	—	—	—
		Net Improvements	791	791	—	756	—	—	—	756	193
	1989	Year End Capacity	65,736	64,945	1,495	51,607	1,622	1,433	189	49,985	12,922
		New Machines	2,181	2,182	—	1,782	—	—	—	1,782	425
		Net Improvements	159	156	—	165	—	—	—	165	142
	1990	Year End Capacity	68,076	67,282	1,495	53,554	1,622	1,433	189	51,932	13,498
		New Machines	1,158	1,158	—	1,137	—	—	—	1,137	713
		Net Improvements	573	571	—	439	—	—	—	439	95
	1991	Year End Capacity	69,807	69,011	1,495	55,130	1,622	1,433	189	53,598	14,298
		New Machines	728	726	—	726	—	—	—	726	215
		Net Improvements	560	560	—	546	—	—	—	546	177
	1992*	Year End Capacity	71,093	70,297	1,495	56,401	1,622	1,433	189	54,789	14,889
YEAR END DAILY RATE 1988-1992	1988	Available Days	358	359	356	359	357	356	362	359	359
	Daily Rate	179.87	177.46	4.20	141.83	4.54	4.02	.52	137.29	35.46	
	1989	Available Days	358	359	356	359	357	356	362	359	359
	Daily Rate	183.41	181.00	4.20	143.95	4.54	4.02	.52	139.41	36.00	
	1990	Available Days	358	359	356	359	357	356	362	359	359
	Daily Rate	189.90	187.49	4.20	149.34	4.54	4.02	.52	144.80	37.56	
	1991	Available Days	358	359	356	359	357	356	362	359	359
	Daily Rate	194.74	192.32	4.20	153.75	4.54	4.02	.52	149.21	39.83	
	1992*	Available Days	358	359	356	359	357	356	362	359	359
	Daily Rate	198.35	195.93	4.20	157.32	4.54	4.02	.52	152.78	40.92	

*Capacity additions presented here for 1992 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.



for construction
paper & board

AND SODA		SEMICHEMICAL			MECHANICAL				SCREEN- INGS	WOOD PULP FOR CONSTRUCTION PAPER & BOARD			
ed & ached	Unbleached	Total	Bleached	Unbleached	Total	Stone Ground- wood	Refiner	Thermo- mechan- ical		Total	Total	Stone Ground- wood & Refiner	Defib- rated/ Exploded
14,056	22,145	4,787	369	4,419	6,432	2,986	345	3,100	4	804	222	583	
—	—	—	—	—	151	101	—	49	—	—	—	—	
291	336	78	2	76	50	(41)	9	82	—	(13)	—	(13)	
14,347	22,481	4,865	370	4,495	6,632	3,047	354	3,231	4	791	222	569	
301	366	—	—	—	523	216	—	307	—	—	—	—	
26	173	59	—	59	(50)	(22)	(12)	(16)	—	1	—	1	
14,674	23,020	4,925	370	4,555	7,105	3,241	342	3,522	4	792	222	571	
431	476	—	—	—	225	36	—	189	—	—	—	—	
159	175	39	—	39	33	6	(12)	39	—	2	—	2	
15,264	23,671	4,964	370	4,593	7,363	3,283	330	3,750	4	795	222	573	
501	71	—	—	—	6	—	—	6	—	—	—	—	
200	138	3	—	3	58	9	—	48	—	1	—	1	
15,964	23,880	4,967	370	4,596	7,426	3,292	330	3,804	4	796	222	574	
14,229	22,270	4,865	370	4,494	6,486	2,965	354	3,156	4	791	222	589	
—	—	—	—	—	474	254	—	220	—	—	—	—	
231	333	2	—	2	33	7	—	26	—	—	—	—	
14,459	22,603	4,866	370	4,496	6,973	3,217	354	3,402	4	791	222	569	
587	770	—	—	—	399	89	—	310	—	—	—	—	
(89)	112	90	—	90	(100)	(42)	(24)	(34)	—	3	—	3	
14,958	23,485	4,956	370	4,586	7,272	3,264	330	3,678	4	794	222	572	
325	99	—	—	—	21	—	—	21	—	—	—	—	
198	145	9	—	9	124	20	—	103	—	2	—	2	
15,481	23,730	4,965	370	4,595	7,417	3,284	330	3,803	4	796	222	574	
450	60	—	—	—	—	—	—	—	—	—	—	—	
202	167	4	—	4	10	8	—	2	—	—	—	—	
16,134	23,957	4,969	370	4,598	7,428	3,293	330	3,805	4	796	222	574	
359	358	359	357	359	362	362	361	363	365	328	333	327	
39.59	62.24	13.56	1.04	12.53	17.86	8.17	.98	8.71	.01	2.41	.67	1.74	
359	358	359	357	359	362	361	361	362	365	328	333	327	
40.24	63.17	13.57	1.04	12.53	19.28	8.90	.98	9.40	.01	2.41	.67	1.74	
359	358	359	357	359	362	361	361	362	365	329	333	327	
41.62	65.62	13.82	1.04	12.78	20.12	9.03	.92	10.17	.01	2.42	.67	1.75	
359	358	359	357	359	362	361	361	362	365	329	333	327	
43.08	66.31	13.84	1.04	12.81	20.52	9.09	.92	10.51	.01	2.42	.67	1.76	
359	358	359	357	359	362	361	361	362	365	329	333	327	
44.92	66.95	13.85	1.04	12.82	20.54	9.11	.92	10.52	.01	2.42	.67	1.76	

†Excludes the delibrated/exploded pulp capacity of mills that produce hard pressed board.

Totals not adjusted for rounding differences.

Annual Capacity/Regional Distribution

paper & paperboard

 TOTAL U.S. CAPACITY		GRADES	 NEW ENGLAND		 MID-ATLANTIC	
1988	1992		1988	1992	1988	1992
		<i>Practical Maximum Basis/Thousands short tons</i>				
82,663	93,236	Total All Grades Paper & Paperboard	6,241	6,657	5,852	6,022
80,533	91,077	TOTAL PAPER & PAPERBOARD	6,185	6,601	5,460	5,631
40,211	45,600	Total Paper	5,289	5,622	4,052	4,173
6,115	7,281	NEWSPRINT	N.A.	N.A.	N.A.	N.A.
23,027	26,460	PRINTING, WRITING & RELATED	3,911	4,204	2,449	2,556
1,735	1,905	Uncoated Groundwood	638	550	N.A.	N.A.
4,347	4,668	Coated Groundwood	1,269	1,354	265	265
3,436	4,735	Coated Free Sheet	609	875	239	303
12,338	13,964	Uncoated Free Sheet (1)	1,387	1,414	1,768	1,810
1,171	1,188	Solid Bleached Bristols	8	10	14	13
5,402	5,657	PACKAGING & INDUSTRIAL CONVERTING	477	477	315	336
5,667	6,203	TISSUE	530	548	1,069	1,061
40,322	45,476	Total Paperboard	896	980	1,408	1,458
20,269	23,249	UNBLEACHED KRAFT	—	—	—	—
18,705	21,280	of which Kraft Linerboard	—	—	—	—
4,733	5,202	SOLID BLEACHED	—	—	—	—
5,788	6,220	SEMICHEMICAL	N.A.	N.A.	—	—
9,532	10,805	RECYCLED	787	867	1,408	1,458
2,130	2,160	Total Construction Paper & Board	56	56	392	391

wood pulp

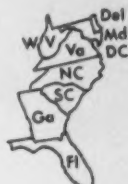
63,754	70,692	Total All Grades Wood Pulp	3,489	3,639	1,438	1,459
62,950	69,896	TOTAL WOOD PULP FOR PAPER & BOARD	3,403	3,553	1,420	1,441
1,450	1,495	DISSOLVING	—	—	—	—
1,627	1,622	SULFITE PAPER GRADES	N.A.	N.A.	N.A.	N.A.
48,654	54,386	SULFATE & SODA PAPER GRADES	2,116	2,232	520	529
14,056	15,964	Bleached & Semibleached Softwood	635	690	156	155
12,450	14,538	Bleached & Semibleached Hardwood	1,419	1,480	364	374
22,149	23,884	Unbleached (2)	N.A.	N.A.	—	—
4,787	4,967	SEMICHEMICAL	N.A.	N.A.	429	430
6,432	7,426	MECHANICAL	1,013	1,045	178	189
804	796	Wood Pulp for Construction Paper & Board (3)	86	86	18	18

(1) Includes cotton fiber and thin papers.

(2) Includes screenings.

(3) Excludes defibrated/exploded pulp capacity of mills that produce hard pressed board. N.A. — Not Available



 E. NO. CENTRAL		 W. NO. CENTRAL		 SO. ATLANTIC		 E. SO. CENTRAL		 W. SO. CENTRAL		 MOUNTAIN & PACIFIC*	
1988	1992	1988	1992	1988	1992	1988	1992	1988	1992	1988	1992
12,889	14,520	1,934	2,670	20,195	22,340	11,055	13,103	12,519	14,598	11,979	13,327
12,645	14,277	1,759	2,476	19,717	21,862	10,648	12,696	12,229	14,298	11,889	13,235
7,803	8,859	1,251	1,958	6,490	7,356	4,478	5,297	5,327	6,088	5,522	6,248
N.A.	N.A.	—	—	1,069	1,299	1,158	1,617	1,219	1,254	1,905	2,321
5,305	6,076	1,225	1,898	3,311	3,872	2,485	2,814	2,403	3,026	1,937	2,014
278	281	N.A.	N.A.	N.A.	N.A.	106	186	N.A.	N.A.	220	236
1,304	1,342	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	64	62
1,139	1,775	N.A.	N.A.	N.A.	N.A.	364	555	N.A.	N.A.	181	198
2,455	2,557	203	468	1,987	2,514	1,738	1,794	1,384	1,936	1,417	1,472
129	122	—	—	480	509	N.A.	N.A.	412	417	56	45
898	1,053	N.A.	N.A.	1,481	1,334	174	174	1,261	1,288	771	934
1,424	1,552	—	—	629	851	662	692	444	519	909	979
4,842	5,418	508	518	13,227	14,506	6,170	7,399	6,902	8,210	6,367	6,987
—	—	—	—	8,718	9,657	3,932	4,895	4,180	5,013	3,439	3,684
—	—	—	—	8,190	9,060	3,474	4,202	3,637	4,367	3,405	3,651
N.A.	N.A.	—	—	1,916	2,136	822	861	1,467	1,607	528	598
1,852	1,910	N.A.	N.A.	1,209	1,312	988	1,135	840	918	715	753
2,990	3,508	433	439	1,384	1,401	428	508	416	672	1,686	1,952
244	243	175	194	478	477	406	406	289	300	90	92
4,010	4,200	790	1,138	20,048	22,314	11,825	13,994	11,424	12,576	10,730	11,371
3,916	4,119	739	1,082	19,845	22,111	11,679	13,848	11,282	12,434	10,666	11,306
—	—	—	—	524	524	N.A.	N.A.	—	—	693	736
351	359	—	—	—	—	—	—	—	—	798	782
1,664	1,796	330	473	17,444	19,676	9,730	11,414	9,571	10,679	7,279	7,587
351	416	N.A.	N.A.	4,922	5,393	2,445	3,330	2,379	2,596	3,084	3,239
1,079	1,127	N.A.	N.A.	3,526	4,513	3,395	3,747	2,251	2,780	182	200
N.A.	N.A.	N.A.	N.A.	8,996	9,770	3,891	4,337	4,941	5,303	4,013	4,148
1,405	1,426	N.A.	N.A.	891	922	733	812	656	665	535	573
496	538	358	558	986	990	983	1,387	1,055	1,091	1,361	1,628
94	81	51	56	203	203	146	146	142	142	64	64

Totals not adjusted for rounding differences.

*Includes Alaska

wood pulp (Except Defibrated/Exploded & Screenings)

Thousands of METRIC tons

	TOTALS		Percent Increase	MECHANICAL		SEMICHEMICAL		CHEMICAL PAPER GRADES		
	1988	1992		1988	1992	1988	1992	1988	1992	of which 1988
WORLD TOTAL	186,516	186,496	12.7	40,858	47,484	9,669	10,142	109,800	123,472	30,526
DEVELOPED										
MARKET ECONOMIES	135,787	151,725	11.7	34,585	40,180	7,761	7,916	89,964	100,029	24,294
NORTH AMERICA	82,326	92,572	12.4	16,937	20,379	4,808	5,020	58,989	65,565	14,150
U.S.	57,306	63,607	11.0	6,037	6,938	4,343	4,506	45,610	50,807	6,760
Canada	25,021	28,965	15.8	10,900	13,441	465	514	13,379	14,758	7,390
JAPAN	13,172	14,732	11.8	3,185	3,447	1,124	1,002	8,538	9,958	793
WESTERN EUROPE	35,717	39,654	11.0	12,717	14,516	1,351	1,408	20,509	22,483	8,666
E.E.C.	7,028	8,018	14.1	3,465	4,040	478	500	2,926	3,244	1,100
Nordic countries	22,745	24,845	9.2	8,280	9,175	805	840	12,985	14,125	5,155
Rest of Western Europe	5,944	6,791	14.2	972	1,301	68	68	4,598	5,114	2,411
OCEANIA	2,702	2,897	7.2	1,376	1,468	314	322	1,012	1,107	295
OTHERS	1,870	1,870	—	370	370	164	164	916	916	390
DEVELOPING										
MARKET ECONOMIES	10,913	15,477	41.8	1,955	2,765	794	1,059	7,766	11,205	2,989
AFRICA	936	1,111	18.7	133	144	32	34	741	903	405
LATIN AMERICA	7,109	11,026	55.1	1,089	1,859	394	562	5,528	8,507	2,239
of which: Brazil	4,352	6,908	58.7	555	1,055	150	300	3,559	5,469	1,518
Mexico	766	898	17.2	220	295	—	—	546	603	—
ASIA	2,868	3,340	16.5	729	762	364	459	1,505	1,799	345
CENTRALLY PLANNED ECONOMIES	18,816	19,293	2.5	4,318	4,539	1,114	1,167	12,070	12,238	3,243
of which: USSR	11,995	12,415	3.5	2,800	3,000	635	635	7,800	8,000	2,600

Totals not adjusted for rounding differences.

*No data available for 1992

Structure of U.S. Paper, Paperboard,

Thousand short tons

capacity in integrated
& nonintegrated
paper & paperboard mills

Integrated mills include all mills with active on-site wood pulp capacity, whether or not this capacity provides a significant portion of total furnish.

Capacities measured on a practical maximum basis.

GRADES	ANNUAL CAPACITY		
	INTEGRATED TO WOOD PULP	NOT INTEGRATED TO WOOD PULP	TOTAL
TOTAL	63,292	19,371	82,663
PAPER	30,596	9,615	40,211
Newsprint	5,584	531	6,115
Uncoated Groundwood	1,382	353	1,735
Coated Groundwood	4,209	138	4,347
Coated Free Sheet	2,609	827	3,436
Uncoated Free Sheet*	9,397	2,659	12,056
Thin Papers	81	201	282
Solid Bleached Bristols	1,076	95	1,171
Pkg. & Ind. Conv.	3,945	1,457	5,402
Tissue	2,312	3,355	5,667
PAPERBOARD	31,454	8,868	40,322
Unbleached Kraft	20,269	—	20,269
Solid Bleached	4,732	1	4,733
Semichemical	5,679	109	5,788
Recycled	774	8,758	9,532
CONSTRUCTION PAPER & BOARD	1,243	887	2,130

*Includes cotton fiber

Totals not adjusted for rounding differences.

paper & paperboard (Except Insulating & Hard Pressed Board) Thousands of METRIC tons

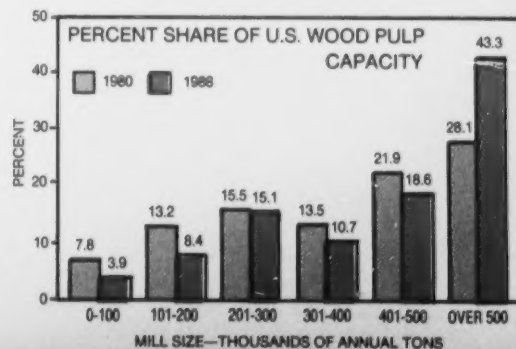
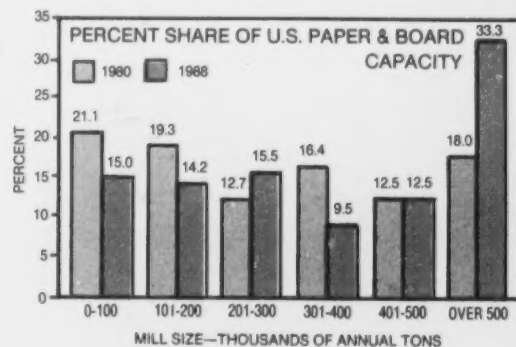
market	DISSOLVING		TOTALS		Percent Increase	NEWSPRINT		PRINTING & WRITING		WRAPPING		ALL OTHERS	
	1988	1992	1988	1992		1988	1992	1988	1992	1988	1992	1988	1992
33,162	5,189	5,397	242,773	278,107	14.6	34,135	40,691	67,425	80,472	110,548	123,821	30,665	33,123
25,890	3,477	3,600	185,889	214,070	15.2	28,342	33,799	54,756	66,168	81,970	91,348	20,821	22,755
15,373	1,592	1,608	90,950	104,148	14.5	15,633	18,435	23,650	28,063	42,299	47,514	9,368	10,136
7,463	1,315	1,356	73,922	83,508	13.0	5,548	6,605	20,634	23,742	38,915	43,674	8,825	9,487
7,910	277	252	17,028	20,640	21.2	10,085	11,830	3,016	4,321	3,384	3,840	543	649
793	325	325	27,143	31,014	14.3	3,208	3,859	7,986	9,803	11,461	12,351	4,488	5,001
9,049	1,140	1,247	62,997	73,901	17.3	8,284	10,253	22,345	27,509	25,852	29,067	6,516	7,072
1,235	159	234	32,873	38,638	17.5	2,618	3,930	12,404	14,673	13,769	15,544	4,082	4,491
5,190	675	705	19,638	22,595	15.1	4,740	5,015	6,720	8,670	6,965	7,590	1,213	1,320
2,624	306	308	10,486	12,668	20.8	926	1,308	3,221	4,166	5,118	5,933	1,221	1,261
285	—	—	2,758	2,921	5.9	775	810	402	417	1,314	1,345	267	349
390	420	420	2,041	2,086	2.2	442	442	373	376	1,044	1,071	182	197
3,974	398	448	24,889	30,318	21.8	2,684	3,708	6,209	7,576	13,451	16,219	2,545	2,815
415	30	30	1,048	1,166	11.3	141	150	304	387	543	568	60	61
3,114	98	98	12,868	15,374	19.5	1,220	1,796	2,893	3,688	6,893	7,846	1,862	2,044
2,146	84	84	3,444	3,872	12.4	420	520	617	649	1,895	2,187	512	516
—	—	—	5,446	7,054	29.5	258	484	1,498	2,126	3,018	3,639	672	805
445	270	320	10,973	13,778	25.6	1,323	1,762	3,013	3,501	6,015	7,806	622	709
3,298	1,314	1,349	31,995	33,719	5.4	3,109	3,184	6,460	6,728	15,127	16,254	7,299	7,553
2,660	760	780	11,600	12,800	10.3	1,900	1,950	1,400	1,500	6,100	6,980	2,200	2,370

Source: Food and Agriculture Organization of the United Nations, U.S. capacity-American Paper Institute.

Wood Pulp Industry — 1988

mill size-paper, paperboard & wood pulp

ANNUAL CAPACITY RANGE Thousands short tons	PAPER & PAPERBOARD		WOOD PULP	
	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY
TOTAL	544	100%	215	100%
0-25	130	2.0	13	0.3
26-50	88	3.9	15	0.9
51-75	67	5.0	13	1.2
76-100	39	4.1	11	1.5
101-125	29	3.9	14	2.5
126-150	29	4.9	11	2.3
151-175	9	1.8	7	1.8
176-200	16	3.6	6	1.8
201-250	32	8.7	23	7.9
251-300	20	6.8	17	7.2
301-350	11	4.5	7	3.6
351-400	11	5.0	12	7.1
401-450	10	5.2	11	7.3
451-500	13	7.3	15	11.3
over 500	40	33.3	40	43.3



Structure of U.S. Paper & Paperboard Industry

size of machines — by principal grade produced

Paper

Machine Annual Capacity Thousands short tons	Newsprint		Printing & Writing		Packaging & Ind. Conv.		Tissue	
	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity
Total	41	100%	421	100%	183	100%	209	100%
0-5	—	—	38	1	33	2	19	1
6-10	—	—	34	1	42	6	28	4
11-15	—	—	23	1	26	6	25	6
16-20	—	—	28	2	18	6	23	7
21-30	—	—	59	7	22	9	34	15
31-40	2	1	43	7	8	5	32	20
41-50	1	1	38	8	3	2	26	21
51-75	5	6	58	16	6	6	17	18
76-100	2	3	36	14	5	8	5	8
101-125	5	10	18	9	7	13	—	—
126-150	12	29	14	8	5	12	—	—
151-200	6	18	24	19	7	20	—	—
201-250	7	28	7	6	—	—	—	—
251-300	1	4	1	1	1	5	—	—

All data based on machines in place January 1987

age of machines — by principal grade produced

Paper

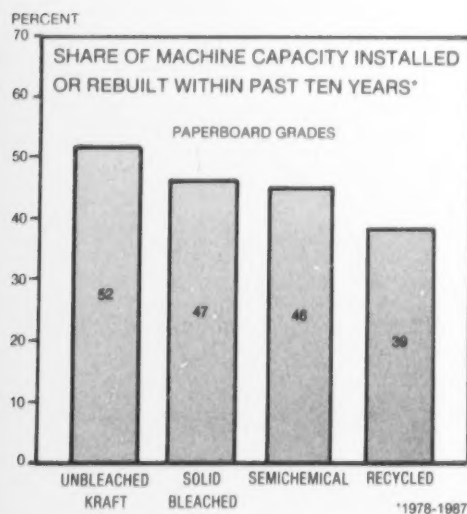
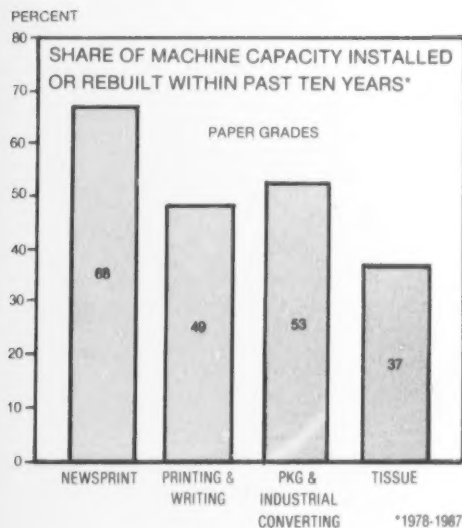
Year Machine Installed Or Rebuilt*	Newsprint		Printing & Writing		Packaging & Ind. Conv.		Tissue	
	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity
Total	41	100%	421	100%	183	100%	209	100%
No Data Available	1	—	64	—	21	—	44	—
Total Sample	40	100%	357	100%	162	100%	165	100%
1986	3	6	18	9	3	4	2	2
1985	2	5	21	5	9	5	9	7
1984	7	14	16	7	3	4	5	4
1983	4	8	15	5	12	7	5	4
1982	1	2	22	7	9	11	1	—
1981	4	13	17	6	8	11	7	6
1980	1	3	18	6	9	8	6	4
1979	5	17	9	2	2	1	5	5
1978	—	—	10	2	3	2	6	5
1977	—	—	13	4	4	5	5	4
1976	1	3	13	3	5	4	12	4
1971-1975	4	10	40	12	21	9	14	10
1966-1970	4	11	50	14	28	13	34	22
1961-1965	—	—	46	10	16	4	28	16
1956-1960	2	4	18	3	6	1	8	3
1951-1955	2	4	13	3	8	4	1	—
Prior to 1951	—	—	18	2	16	7	17	4

All data based on machines in place January 1987

age of machines — by geographic region

Year Machine Installed Or Rebuilt*	Total U.S.		New England		Mid-Atlantic		E. No. Central	
	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity
Total	1,239	100%	208	100%	204	100%	318	100%
No Data Available	201	—	41	—	56	—	40	—
Total Sample	1,038	100%	167	100%	148	100%	278	100%
1986	37	7	4	6	2	1	11	6
1985	56	5	8	3	6	5	22	8
1984	37	5	3	2	3	2	10	5
1983	45	3	8	1	9	5	11	4
1982	50	7	17	13	5	2	8	6
1981	49	6	3	4	6	5	14	6
1980	48	6	7	5	4	4	14	6
1979	33	5	4	2	4	3	6	4
1978	34	4	5	4	4	1	6	4
1977	32	3	9	7	2	1	5	3
1976	38	3	6	5	3	2	12	2
1971-1975	138	14	18	15	22	22	40	16
1966-1970	153	14	28	15	28	20	40	13
1961-1965	113	8	20	9	21	13	24	5
1956-1960	53	3	5	1	13	8	15	3
1951-1955	35	3	7	6	3	2	9	2
Prior to 1951	87	4	15	2	13	4	31	7

All data based on machines in place January 1987





Paperboard

Machine Annual Capacity Thousands short tons	Unbleached Kraft		Solid Bleached		Semichemical		Recycled	
	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity
Total	66	100%	27	100%	38	100%	187	100%
0-5	—	—	—	—	—	—	5	—
6-10	—	—	—	—	—	—	1	—
11-15	—	—	—	—	—	—	10	1
16-20	—	—	—	—	—	—	13	3
21-30	—	—	—	—	—	—	31	8
31-40	—	—	—	—	1	1	29	11
41-50	—	—	1	1	—	—	26	13
51-75	2	1	2	2	5	6	43	27
76-100	1	—	—	—	2	3	15	13
101-125	2	2	—	—	10	20	6	7
126-150	2	2	1	3	8	20	3	4
151-200	9	9	15	51	5	16	2	4
201-250	13	15	4	16	3	12	2	5
251-300	7	11	2	10	2	10	1	3
301-400	21	38	1	7	2	12	—	—
over 400	9	22	1	10	—	—	—	—

Construction Grades

Construction	
Number of Machines	Share of Total Capacity
67	100 %
10	1
9	4
6	3
6	5
12	15
5	8
5	10
5	15
7	28
1	5
1	6
—	—
—	—
—	—
—	—

Paperboard

Year Machine Installed Or Rebuilt*	Unbleached Kraft		Solid Bleached		Semichemical		Recycled	
	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity
Total	66	—	27	—	38	—	187	—
No Data Available	—	—	—	—	—	—	41	—
Total Sample	66	100%	27	100%	38	100%	146	100%
1986	3	5	4	26	1	2	3	5
1985	3	5	—	—	2	5	8	7
1984	1	1	—	—	1	5	4	3
1983	1	2	—	—	—	—	7	4
1982	7	11	1	3	3	9	6	6
1981	3	5	—	—	1	6	9	6
1980	7	10	1	3	1	2	6	4
1979	5	6	3	11	1	1	3	3
1978	4	7	1	4	5	16	3	1
1977	1	2	1	4	1	3	5	6
1976	1	2	2	7	1	—	3	2
1971-1975	6	10	4	15	12	30	25	20
1966-1970	8	15	3	12	6	14	16	9
1961-1965	7	10	3	7	2	5	7	3
1956-1960	3	2	3	5	1	2	6	4
1951-1955	3	4	1	3	—	—	9	4
Prior to 1951	3	3	—	—	—	—	26	13

Construction Grades

Construction	
Number of Machines	Share of Total Capacity
67	100 %
30	—
37	—
—	—
—	—
1	—
—	—
—	—
—	—
1	1
2	8
1	2
12	44
4	6
4	9
4	15
1	1
7	14

*Rebuilds include only modifications which significantly extended the useful life or increased the capacity of a machine.

Year Machine Installed Or Rebuilt*	W. No. Central		South Atlantic		E. So. Central		W. So. Central		Mountain & Pacific	
	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity	Number of Machines	Share of Total Capacity
Total	32	—	159	—	85	—	95	—	138	—
No Data Available	4	—	26	—	10	—	8	—	16	—
Total Sample	28	100%	133	100%	75	100%	87	100%	122	100 %
1986	—	—	6	7	7	14	7	12	—	—
1985	—	—	8	7	4	6	3	2	5	5
1984	—	—	6	5	3	5	5	3	7	7
1983	2	5	6	4	5	6	—	—	4	3
1982	1	13	5	4	4	10	5	10	5	7
1981	1	3	8	5	2	2	6	10	9	9
1980	2	4	7	5	6	8	2	3	6	8
1979	—	—	7	9	1	2	3	3	8	7
1978	1	3	9	9	1	1	3	3	5	3
1977	—	—	3	2	2	4	3	4	8	6
1976	2	5	4	4	1	1	4	2	6	2
1971-1975	4	18	19	10	13	15	9	13	13	14
1966-1970	4	16	16	12	7	14	17	20	13	7
1961-1965	7	18	9	6	8	4	7	8	17	12
1956-1960	1	5	7	3	5	4	4	3	3	2
1951-1955	2	6	4	4	1	1	4	2	5	6
Prior to 1951	1	4	9	4	5	3	5	2	8	2

*Rebuilds include only modifications which significantly extended the useful life or increased the capacity of a machine.

Fiber Sources for paper/paperboard/ wood pulp manufacture

fiber consumption in paper & paperboard manufacture

	Total U.S.	Percent of Total Fiber	New England	Mid- Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain & Pacific
1988										
TOTAL FIBER	79,660	100.0	5,695	5,355	12,201	1,648	19,478	10,622	12,628	12,033
TOTAL WOOD PULP	59,396	74.6	4,230	2,854	6,570	1,069	15,952	9,241	10,804	8,676
Manufactured on-site	49,660	62.3	2,425	1,200	2,982	711	15,263	8,826	10,596	7,657
*Purchased	6,603	8.3	1,012	1,235	2,663	288	397	338	96	575
*Transferred	3,133	4.0	793	419	926	69	293	77	112	444
†TOTAL RECYCLABLE PAPER	19,887	24.9	1,384	2,434	5,565	568	3,517	1,358	1,772	3,290
Mixed Papers	2,182	2.7	164	299	662	108	410	228	107	204
Newspapers	3,215	4.0	156	705	739	75	487	79	166	810
Corrugated	9,909	12.4	475	729	2,624	316	2,124	851	874	1,917
Pulp Substitutes	2,889	3.6	447	442	709	52	428	182	342	286
High Grade Deinking	1,691	2.2	141	259	831	17	68	18	283	74
OTHER FIBERS	377	0.5	81	67	66	12	9	23	52	66
1989										
TOTAL FIBER	82,223	100.0	5,790	5,418	12,544	1,719	20,218	11,174	13,046	12,315
TOTAL WOOD PULP	60,957	74.1	4,295	2,862	6,656	1,137	16,499	9,565	11,126	8,817
Manufactured on-site	51,173	62.2	2,459	1,218	3,038	767	15,821	9,168	10,899	7,804
*Purchased	6,657	8.0	1,018	1,232	2,628	320	417	335	111	595
*Transferred	3,127	3.9	818	412	990	50	261	63	116	418
†TOTAL RECYCLABLE PAPER	20,877	25.4	1,408	2,471	5,832	570	3,710	1,585	1,871	3,430
Mixed Papers	2,244	2.7	156	294	699	110	431	230	114	211
Newspapers	3,337	4.1	174	688	755	77	547	80	169	846
Corrugated	10,533	12.8	479	772	2,738	318	2,216	1,072	934	2,003
Pulp Substitutes	2,901	3.5	454	440	723	48	427	175	346	288
High Grade Deinking	1,863	2.3	145	277	917	18	89	26	308	82
OTHER FIBERS	389	0.5	86	85	56	12	9	23	49	68
1990										
TOTAL FIBER	85,574	100.0	5,975	5,568	13,239	1,884	20,837	11,882	13,380	12,810
TOTAL WOOD PULP	62,593	73.1	4,361	2,914	6,901	1,294	16,719	10,034	11,356	9,013
Manufactured on-site	52,717	61.6	2,568	1,231	3,157	876	16,055	9,702	11,126	8,004
*Purchased	6,667	7.8	971	1,257	2,701	372	408	283	85	591
*Transferred	3,209	3.7	822	426	1,044	47	257	50	146	418
†TOTAL RECYCLABLE PAPER	22,568	26.4	1,514	2,567	6,279	578	4,110	1,824	1,966	3,729
Mixed Papers	2,341	2.7	156	297	726	118	457	258	114	216
Newspapers	3,690	4.3	183	711	806	79	761	95	171	884
Corrugated	11,424	13.4	545	803	2,950	319	2,308	1,244	1,012	2,243
Pulp Substitutes	3,087	3.6	482	477	765	44	457	197	359	305
High Grade Deinking	2,025	2.4	147	278	1,032	18	128	29	310	82
OTHER FIBERS	414	0.5	100	87	59	12	9	23	58	67
1991										
TOTAL FIBER	89,215	100.0	6,220	5,723	13,809	2,086	21,721	12,633	13,787	13,236
TOTAL WOOD PULP	65,109	72.9	4,570	2,968	7,092	1,457	17,365	10,631	11,655	9,281
Manufactured on-site	54,977	61.6	2,774	1,244	3,252	1,012	16,695	10,319	11,421	8,259
*Purchased	6,753	7.6	969	1,297	2,739	399	414	268	73	594
*Transferred	3,290	3.7	827	427	1,101	47	256	43	162	428
†TOTAL RECYCLABLE PAPER	23,739	26.6	1,549	2,664	6,656	607	4,347	1,956	2,073	3,887
Mixed Papers	2,458	2.8	158	309	757	123	479	264	125	243
Newspapers	3,817	4.3	185	726	826	91	786	96	180	927
Corrugated	11,978	13.4	555	846	3,082	331	2,466	1,327	1,055	2,317
Pulp Substitutes	3,242	3.6	503	499	801	44	472	224	382	318
High Grade Deinking	2,244	2.5	148	283	1,190	18	145	45	332	83
OTHER FIBERS	456	0.5	101	91	62	21	10	47	58	67

*Comprises all dried, wet lap or slush pulp not produced on-site including transfers from company owned or affiliated mills.

†Includes construction grades and molded pulp products.

fiber consumption in paper & paperboard manufacture (continued)

Thousands short tons

	Total U.S.	Percent of Total Fiber	New England	Mid- Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain & Pacific
1992										
TOTAL FIBER	91,915	100.0	6,432	5,780	14,229	2,106	22,453	12,842	14,451	13,622
TOTAL WOOD PULP	66,483	72.3	4,729	2,990	7,290	1,481	17,810	10,808	11,978	9,396
Manufactured on-site	55,992	60.9	2,824	1,244	3,288	1,027	17,083	10,491	11,665	8,370
*Purchased	7,060	7.7	1,071	1,319	2,882	407	415	275	91	599
*Transferred	3,431	3.7	834	427	1,120	47	311	43	222	427
†TOTAL RECYCLABLE PAPER	24,983	27.2	1,601	2,698	6,877	613	4,633	1,987	2,415	4,159
Mixed Papers	2,531	2.8	162	315	771	124	493	267	125	274
Newspapers	3,970	4.3	199	733	843	92	812	96	182	1,014
Corrugated	12,857	14.0	563	866	3,222	334	2,678	1,344	1,384	2,466
Pulp Substitutes	3,318	3.6	528	499	817	44	485	232	390	323
High Grade Deinking	2,307	2.5	149	285	1,224	19	166	47	335	83
OTHER FIBERS	450	0.5	102	92	62	12	10	47	58	67

pulpwood consumption in wood pulp manufacture

Thousands of CORDS

1988										
TOTAL PULPWOOD	93,099	100.0	5,160	2,177	5,354	1,100	29,123	16,961	16,436	16,789
Roundwood & Roundwood Chips	56,061	60.2	4,051	1,788	4,162	998	19,751	12,559	10,218	2,535
Forest Residues	4,348	4.7	—	66	507	33	1,113	828	1,481	320
Manufacturing Residues	32,689	35.1	1,109	322	684	69	8,259	3,575	4,737	13,934
1989										
TOTAL PULPWOOD	96,095	100.0	5,247	2,208	5,617	1,150	30,250	17,537	17,014	17,073
Roundwood & Roundwood Chips	58,221	60.6	4,096	1,817	4,425	1,050	20,666	12,853	10,556	2,759
Forest Residues	4,562	4.7	—	67	481	33	1,159	969	1,544	308
Manufacturing Residues	33,312	34.7	1,151	324	711	67	8,425	3,715	4,914	14,005
1990										
TOTAL PULPWOOD	98,052	100.0	5,304	2,224	5,689	1,261	30,233	18,390	17,420	17,530
Roundwood & Roundwood Chips	59,477	60.7	4,154	1,832	4,524	1,157	20,824	13,339	10,612	3,034
Forest Residues	4,632	4.7	—	67	487	35	1,149	993	1,559	341
Manufacturing Residues	33,943	34.6	1,150	325	678	68	8,260	4,058	5,249	14,155
1991										
TOTAL PULPWOOD	102,539	100.0	5,488	2,248	5,743	1,483	32,150	19,663	17,835	17,929
Roundwood & Roundwood Chips	61,849	60.3	4,194	1,856	4,576	1,378	21,805	13,970	11,049	3,022
Forest Residues	4,649	4.6	—	67	487	36	1,157	997	1,556	349
Manufacturing Residues	36,041	35.1	1,294	326	680	68	9,188	4,696	5,230	14,559
1992										
TOTAL PULPWOOD	105,065	100.0	5,566	2,248	5,779	1,499	33,049	20,575	18,219	18,131
Roundwood & Roundwood Chips	63,757	60.7	4,271	1,856	4,612	1,393	22,626	14,610	11,324	3,065
Forest Residues	4,750	4.5	—	67	487	37	1,160	997	1,627	374
Manufacturing Residues	36,559	34.8	1,294	326	680	69	9,262	4,967	5,268	14,693

FIBER

CONSUMPTION

DEFINITIONS

1988 — Actual consumption

1989 — Best estimate based on year-to-date experience

1990-1992 — Consumption at capacity levels of production

Totals not adjusted for rounding differences.

Recyclable Paper Consumed in Paper & Paperboard Manufacture

actual consumption

Thousands short tons

END PRODUCTS	1988					
	Total	Mixed Papers	News-papers	Corru-gated	Pulp Substi-tutes	High Grade Deinking
TOTAL ALL GRADES	19,887	2,182	3,215	9,909	2,889	1,691
TOTAL PAPER	5,650	201	1,618	395	2,004	1,432
NEWSPRINT	1,431	—	1,431	—	—	—
PRINTING, WRITING & RELATED	1,416	13	—	44	1,039	320
PACKAGING & IND. CONVERTING	265	14	10	75	160	6
TISSUE	2,538	174	177	276	805	1,106
TOTAL PAPERBOARD	13,371	1,644	1,318	9,331	842	237
KRAFT, BLEACHED & UNBLEACHED	2,042	—	—	1,876	96	71
SEMICHEMICAL	1,845	56	10	1,722	57	—
RECYCLED CORRUGATING	2,081	47	14	2,016	3	—
OTHER RECYCLED	7,403	1,541	1,294	3,717	686	166
CONSTRUCTION PAPER & BOARD	865	336	279	183	44	22

Data on recyclable paper are collected in an industry-wide survey of paper and paperboard mills under the following definitions.

1988 — Actual consumption

1989 — Best estimate based on year-to-date experience

1990-1992 — Consumption at capacity levels of production

planned future consumption

Thousands short tons

END PRODUCTS	1989					
	Total	Mixed Papers	News-papers	Corru-gated	Pulp Substi-tutes	High Grade Deinking
TOTAL ALL GRADES	20,877	2,244	3,337	10,533	2,901	1,863
TOTAL PAPER	5,960	230	1,699	433	2,015	1,581
NEWSPRINT	1,498	—	1,498	—	—	—
PRINTING, WRITING & RELATED	1,447	15	—	43	1,041	347
PACKAGING & IND. CONVERTING	253	17	9	76	149	2
TISSUE	2,762	198	192	314	825	1,232
TOTAL PAPERBOARD	14,034	1,669	1,351	9,916	840	257
KRAFT, BLEACHED & UNBLEACHED	2,311	—	—	2,127	103	81
SEMICHEMICAL	1,935	54	10	1,815	56	—
RECYCLED CORRUGATING	2,165	48	16	2,098	3	—
OTHER RECYCLED	7,623	1,567	1,325	3,876	678	176
CONSTRUCTION PAPER & BOARD	884	344	287	184	46	23

END PRODUCTS	1990					
	Total	Mixed Papers	News-papers	Corru-gated	Pulp Substi-tutes	High Grade Deinking
TOTAL ALL GRADES	22,568	2,341	3,690	11,424	3,087	2,025
TOTAL PAPER	6,596	264	1,955	474	2,157	1,746
NEWSPRINT	1,754	9	1,744	—	—	—
PRINTING, WRITING & RELATED	1,517	15	—	45	1,089	368
PACKAGING & IND. CONVERTING	253	17	9	81	144	2
TISSUE	3,072	223	202	348	924	1,376
TOTAL PAPERBOARD	15,020	1,718	1,401	10,763	881	258
KRAFT, BLEACHED & UNBLEACHED	2,694	—	—	2,511	102	81
SEMICHEMICAL	2,063	59	10	1,932	62	—
RECYCLED CORRUGATING	2,343	49	16	2,275	3	—
OTHER RECYCLED	7,921	1,610	1,375	4,045	714	177
CONSTRUCTION PAPER & BOARD	953	360	335	188	50	21

END PRODUCTS	1991					
	Total	Mixed Papers	News-papers	Corru-gated	Pulp Substi-tutes	High Grade Deinking
TOTAL ALL GRADES	23,739	2,458	3,817	11,978	3,242	2,244
TOTAL PAPER	7,087	304	2,016	493	2,311	1,963
NEWSPRINT	1,831	33	1,798	—	—	—
PRINTING, WRITING & RELATED	1,608	15	—	45	1,161	388
PACKAGING & IND. CONVERTING	255	17	9	79	145	4
TISSUE	3,393	239	209	369	1,005	1,571
TOTAL PAPERBOARD	15,671	1,776	1,449	11,283	900	260
KRAFT, BLEACHED & UNBLEACHED	2,830	—	—	2,651	97	81
SEMICHEMICAL	2,093	59	10	1,961	62	—
RECYCLED CORRUGATING	2,436	49	17	2,366	3	—
OTHER RECYCLED	8,312	1,668	1,422	4,305	738	179
CONSTRUCTION PAPER & BOARD	982	378	351	201	31	21

END PRODUCTS	1992					
	Total	Mixed Papers	News-papers	Corru-gated	Pulp Substi-tutes	High Grade Deinking
TOTAL ALL GRADES	24,983	2,531	3,970	12,857	3,318	2,307
TOTAL PAPER	7,397	348	2,131	513	2,380	2,024
NEWSPRINT	1,965	61	1,904	—	—	—
PRINTING, WRITING & RELATED	1,635	15	—	45	1,184	392
PACKAGING & IND. CONVERTING	259	17	9	78	150	4
TISSUE	3,538	255	218	390	1,046	1,628
TOTAL PAPERBOARD	16,584	1,801	1,484	12,141	906	261
KRAFT, BLEACHED & UNBLEACHED	3,035	—	—	2,856	98	81
SEMICHEMICAL	2,294	59	10	2,163	62	—
RECYCLED CORRUGATING	2,483	49	17	2,414	3	—
OTHER RECYCLED	8,782	1,693	1,457	4,708	743	180
CONSTRUCTION PAPER & BOARD	991	381	354	204	32	21

Tota's not adjusted for rounding differences.

Recyclable paper for molded pulp included under Construction Paper & Board as follows:
1988, 203,000 tons; 1989, 212,000 tons; 1990-1992, 225,000 tons.

Announced Capacity Expansion New Mills & Machines

Expansion projects include new paper, paperboard and wood pulp mills and new paper and paperboard machines in existing mills. These projects have been publicly announced by the managements of the companies concerned and are included in the capacity

estimates reported in this survey. Survey estimates also include confirmed expansion projects that have not been publicly announced which, in keeping with the confidential nature of the survey, are not included in this listing.

Thousands short tons

Grade	Annual Capacity	Proposed Start-up	Company & Location
Newsprint	245†	1990	Alabama River Newsprint Company Clairborne, AL
Newsprint	225†	1989	Newsprint South Inc. Grenada, MS
Newsprint	245	1991	North Pacific Paper Company Longview, WA
Newsprint	195†	1989	Ponderay Newsprint Company Usk, WA
Newsprint	230	1989	Southeast Paper Manufacturing Company Dublin, GA
Coated Groundwood	220 net*	1989	Blandin Paper Company Grand Rapids, MN
Coated Free Sheet	265	1990	Champion International Corporation Quinnesec, MI
Coated Free Sheet	212	1991	Consolidated Papers Inc. Wisconsin Rapids, WI
Coated Free Sheet	125 net*	1988	Midtec Paper Corporation Kimberly, WI
Coated Free Sheet	100**	1988	Potlatch Corporation Cloquet, MN
Coated Free Sheet	215	1990/1991	Scott Paper Company Skowhegan, ME
Uncoated Free Sheet	300	1991	Boise Cascade Corporation International Falls, MN
Uncoated Free Sheet	290	1988	Georgia-Pacific Corporation Port Hudson, LA
Uncoated Free Sheet	325	1991	Great Northern Nekoosa Corporation Ashdown, AR
Uncoated Free Sheet	240	1991	Union Camp Corporation Eastover, SC
Uncoated Free Sheet	255†	1990	Willamette Industries Inc. Bennettsville, SC
Uncoated Free Sheet and Specialty Papers	30	1989	Kimberly-Clark Corporation Whiting, WI
Tissue	80	1990	Chesapeake Corporation (Wisconsin Tissue Division) Menasha, WI
Tissue	N.A.	1988	Fort Howard Paper Company Rincon, GA
Tissue	N.A.	1989	
Tissue	N.A.	1991	
Tissue	70	1989	FSC Paper Company Alsip, IL
Tissue	70	1988	James River Corporation Wauna, OR
Tissue	68†	1990	Kimberly-Clark Corporation Jenks, OK
Tissue	NA†	1991	Kimberly-Clark Corporation Loudon, TN
Specialty Packaging Papers	59	1990	Consolidated Papers Inc. Stevens Point, WI
Special Industrial Papers	N.A.	1989	Hollingsworth & Vose Company Hawkinsville, GA
Unbleached Kraft Linerboard	350	1990	Gaylord Container Corporation Bogalusa, LA
Unbleached Kraft Packaging Paper	100	1990	Longview Fibre Company Longview, WA
Unbleached Kraft Paperboard	375	1990	Mead Corporation Mahrt, AL
Unbleached Kraft Linerboard	235 net*	1991	Union Camp Corporation Savannah, GA
Unbleached Kraft Linerboard	NA*	1992	Weyerhaeuser Company Springfield, OR
Solid Bleached Paperboard	220††	1992	Westvaco Corporation Covington, VA
Recycled Containerboard	175†	1992	Daishowa America and Trans-Rim Enterprises, Ltd. Stockton, CA
Recycled Linerboard	270†	1991	Kenaf of North America Inc. Muskogee, OK
Recycled Paperboard	60	1989	Newark Boxboard Company Mobile, AL
Recycled Paperboard	35	1990	U.S. Paper Mills Corporation Menasha, WI

projects
included in
survey
estimates

*Will replace existing capacity. N.A. — Not Available.

**Gross increase. will replace unspecified existing capacity.

† New mill.

†† Eventual capacity 350

Definitions and Grade Descriptions

► PRACTICAL MAXIMUM CAPACITY

Practical Maximum Capacity, as defined in this survey, is the tonnage of paper, paperboard or pulp of normal commercial quality that could be produced with full use of equipment and adequate supplies of raw materials and labor, and assuming full demand. No allowance is made for losses due to unscheduled shutdowns, strikes, temporary lack of power, etc., which cause decreases in actual production but not in productive capacity. Capacity of paper machines which produce more than one grade is apportioned in accordance with actual production patterns or plans for future operation.

Capacity is reported in short tons of net finished paper and paperboard and air-dry (10% moisture content) pulp. Shrinkage of bleached or semibleached pulp is taken into account.

Annual practical maximum capacity — includes changes in capacity only for the portion of the year in which they are actually effective.

Year-end practical maximum capacity — assumes that all changes in capacity are in effect from the first day of the year in which they occur.

NEW MACHINES AND NET IMPROVEMENTS: Capacity increases or decreases are shown in two main groups: New Machines and Net Improvements.

New Machines — are defined as machines purchased or to be purchased from equipment manufacturers. Consequently, capacity changes resulting from transfers of paper machines from one mill to another are shown under Net Improvements.

Net Improvements — are defined as net changes resulting from modernization of machines, dismantling old machines, shifts in grades, etc.

Capacity increases from new machines are shown under New Machines for the first two years of operation (including the year of installation). Any additional capacity realized in a third or subsequent year is shown under Net Improvements.

MARKET PULP CAPACITY: Market pulp in this survey is defined as wood pulp produced in the U.S. for sale to pulp consumers. It excludes pulp for use or consumption by a production mill or for shipment by a producing mill to other mills within its supply region which it owns, controls or with which it is affiliated. Shipments to owned mills outside the U.S. are defined as market pulp.

► PAPER GRADES

NEWSPRINT: Paper used chiefly in the printing of newspapers, made largely from mechanical pulp and weighing not less than 28½ pounds nor more than 35 pounds (24 x 36 - 500).

UNCOATED GROUNDWOOD: Uncoated papers containing more than 10% groundwood or other mechanical pulps in their furnish, excluding newsprint.

MACHINE AND OFF MACHINE COATED: Bleached papers with a coating weight of at least 2½ pounds (25 x 38 - 500) on either side and at least 50% of the coating consisting of clay (Kaolin).

Coated Groundwood: Coated papers containing more than 10% mechanical pulp (mostly stone groundwood and/or refiner) in their furnish.

Coated Free Sheet: Coated papers containing 10% or less mechanical pulp (mostly stone groundwood and/or refiner in their furnish).

UNCOATED FREE SHEET: Bleached uncoated printing and writing papers containing not more than 10% groundwood or other mechanical pulps in their furnish; i.e., offset, tablet, envelope, business papers (bond, ledger, mimeo, duplicator) form bond, cover and text and related papers.

BLEACHED BRISTOLS: Includes tabulating index, tag and file folder, coated cover bristols, and uncoated bristols (index, printing, and postcard).

COTTON FIBER: Papers containing 25% or more in their furnish of cotton, cotton rags, cotton waste, linters, linter pulp, flax, or similar fibers.

THIN PAPERS: Includes carbonizing, condenser, cigarette, bible, and similar papers.

PACKAGING AND INDUSTRIAL CONVERTING: Wrapping paper, shipping sack, bag and sack other than shipping sack, and other converting papers — 18 pounds and over.

Unbleached Kraft: Paper containing more than 80% unbleached sulfate wood pulp. Wrapping paper, shipping sack, grocers sack and other bag, and other converting papers — 18 lbs. and over (24 x 36 - 500).

Bleached Packaging and Industrial Converting: Paper made for similar end uses as unbleached kraft, but made from bleached, and semibleached sulfate and unbleached sulfite pulps. Wrapping paper, shipping sack, grocers and other bag and sack, and other converting papers — 18 lbs. and over (24 x 36 - 500).

Specialty Packaging: Paper and board of all weights and furnishes, usually used as protective packaging for food and other consumer products, such as bakery bags, fast food and frozen food wraps. Also includes glassine, greaseproof and vegetable parchment paper.

Special Industrial: Paper and board, of all weights, calipers and furnishes, designed for specialized end uses and manufactured to exact customer specifications; includes abrasive paper, electrical insulation, filter

paper and similar grades. Does not include wet machine board.

TISSUE: Includes sanitary grades: i.e., toilet, facial, napkin, toweling, sanitary napkin, wiper and special sanitary papers, and waxing, wrapping, wadding and miscellaneous grades.

► PAPERBOARD GRADES

UNBLEACHED KRAFT PAPERBOARD: Paperboard made from a furnish containing not less than 80% wood pulp produced by the kraft sulfate process.

Linerboard: Unbleached kraft paperboard manufactured for use as facing material when combining paperboard for conversion into corrugated or solid fiber boxes. Includes solid unbleached kraft linerboard, both Fourdrinier and Cylinder, mottled white linerboard and clay coated unbleached kraft linerboard.

Folding: Paperboard manufactured, such as clay coated unbleached kraft and bleached lined unbleached kraft backed, for conversion into folding cartons and beverage carriers.

Other: All unbleached kraft paperboard whose end use is not otherwise classified, such as board for a filler for solid fiber board to be fabricated into a shipping container, tube, can, drum, file folder, tag, automotive panel, etc.

SOLID BLEACHED PACKAGING PAPERBOARD: Paperboard made for use in packaging from a furnish containing not less than 80% virgin bleached wood pulp. Bleached bristols not manufactured for packaging are included in the proper bleached Bristol classification under papers.

Linerboard: Solid bleached paperboard, either Fourdrinier or Cylinder, manufactured for use as facing material when combining paperboard for conversion into corrugated or solid fiber boxes.

Folding: Solid bleached paperboard for conversion into folding cartons, such as folding cartons for ice cream, butter, oleomargarine, frozen foods, bakery products, cosmetics, drugs, etc.

Milk Carton and Food Service: Solid bleached paperboard for conversion into milk carton, heavyweight cup, and round nested food container, plate, dish and tray, and for packaging for moist, liquid and oily foods.

Other: Solid bleached paperboard for conversion into packaging of blister pack, tubes and other products not classified above and for industrial products not classified under bleached bristols.

SEMICHEMICAL PAPERBOARD: Paperboard made from a furnish containing not less than 75% virgin wood pulp, the predominant portion of which is produced by a semichemical process.



RECYCLED PAPERBOARD: Paperboard manufactured from a combination of recycled fibers from various grades of paper stock with the predominant portion of its furnish being recycled fibers; sometimes including a very minor portion of virgin fibers.

Linerboard: Recycled paperboard produced from a furnish containing less than 80% virgin kraft wood pulp and used as facing material when combining paperboard for conversion into corrugated or solid fiber boxes.

Corrugating Medium: Recycled paperboard produced from a furnish containing less than 75% virgin wood pulp and used as the fluting material when combining paperboard for conversion into corrugated boxes.

Container Chip and Filler Board: Recycled paperboard manufactured as a filler for solid fiber board for conversion into solid fiber boxes and other container chipboard (all chipboard under 26 pounds per 1000 sq. ft. manufactured for use as facing corrugated, solid fiber and single faced products which are used for interior packaging, e.g., pads, partitions, dividers, layers and cushioning).

Folding: Recycled paperboard manufactured with bending quality for conversion into folding cartons (including unlined chipboard, kraft lined, white lined and clay coated).

Set-up: Recycled paperboard manufactured with non-bending specifications for conversion into rigid or set-up boxes (including plain chipboard, newlined, white vat lined).

Gypsum Wallboard Facing: Recycled paperboard manufactured for use as liner or facing on gypsum board, plasterboard (includes white, cream, gray, blue and all colors).

Other: Recycled paperboard with the same characteristics as paperboard for bending packaging or non-bending packaging but not for non-packaging uses; plus recycled paperboard for end uses not otherwise classified, such as tag, file folder, tube, can, drum, match stem, tablet backs, toys, etc.

► CONSTRUCTION PAPER & BOARD & OTHER

CONSTRUCTION PAPER: Sheathing paper, felts (roofing felts, floor covering, automotive felts, deadening, industrial, pipe covering, refrigerator), asbestos paper and asbestos filler paper, flexible wood fiber insulation.

WET MACHINE BOARD: Binders board, shoe board (e.g., counter board, heel board, innersole, etc.) automotive board, chair seat backing, coaster board, luggage, mill board, panel board, table top board, etc.

INSULATING BOARD: A fibrous-felted ho-

mogenous panel made by interfelting of the fibers (e.g., interior building board, wall-board, sound deadening board, acoustical tile, exterior sheathing board, roof insulation board, trailer board, etc.).

► WOOD PULP

DISSOLVING & SPECIAL ALPHA: Highly refined bleached white sulfite or sulfate pulp with a high content of alpha (pure cellulose) fiber.

SULFITE PAPER GRADES: Paper grade pulps produced by the sulfite process. Bleached pulp must achieve a G.E. Brightness of more than 75.

SULFATE & SODA PAPER GRADES: Paper grade pulps produced by the sulfate or soda process. Bleached pulp must achieve a G.E. Brightness of more than 75. Semibleached pulp must achieve a G.E. Brightness of not less than 45 or more than 75.

SEMICHEMICAL: High yield pulps produced with the use of some chemical agent such as neutral sulfite (N.S.S.C.); alkaline cook; chemipulp (defibrated pulp put through reaction chambers); chemi-mechanical pulp with a yield usually above 60%.

MECHANICAL: Fine textured, usually bright pulps, used in paper and paperboard manufacture and produced by mechanical rather than chemical processes.

Stone Groundwood: Pulp produced by grinding wood logs or bolts (usually 4 ft. in length) into relatively short fibers.

Refiner: Pulp produced by subjecting wood chips and/or residues to atmospheric or open discharge refining.

Thermomechanical: A high-yield pulp produced by a thermomechanical process in which wood particles are softened by preheating under pressure prior to a pressurized primary refining stage. Usually replaces or reduces the chemical pulp component in newsprint or groundwood papers.

► WOOD PULP FOR CONSTRUCTION PAPER & PAPERBOARD

Coarse, often brown, pulps used in the manufacture of insulating board and construction paper. Also includes similar pulps if used in the manufacture of wet machine board. Excludes pulp for hard pressed board.

Stone Groundwood and Refiner: Pulps produced by the stone groundwood or refiner processes but used in the manufacture of construction paper and board.

Defibrated/Exploded: Pulps produced by subjecting wood chips to preheating and pressurized retining. Similar to the thermomechanical process except that operating variables produce an economical, coarse brown pulp suitable only for construction paper and board.

Screening: Rejects and off-quality screenings from all grades of wood pulp except dissolving.

► FIBERS

Roundwood: Comprises roundwood bolts and logs (4 feet or longer, including tree lengths) brought to the pulpmill for chipping, or chips made from primary roundwood bolts and logs at a chipmill, remote from the pulpmill.

Forest Residues: All logging residues such as portions of bolts or logs less than the minimum diameter specified by the consuming mill and poles, saplings, slash, limbs, twigs, or portions of bolts or logs not regarded as merchantable in normal pulpwood or sawlog operations. May also include merchantable portions of trees that will not be used for higher value products. Chips made from forest residues.

Manufacturing Residues: All mill residues such as slabs, edgings, trimmings, cores, planer shavings, sawdust or other wood residues of a wood manufacturing process and chips made from these residues.

Other Fibers: Cotton linters, cotton linter pulp, textile mill waste and cuttings, rags, waste rope and cordage, bagasse, flax, straw, jute, esparto, kenaf and all other vegetable fibers used in paper and paperboard manufacture.

► RECYCLABLE FOR WASTE PAPER

Definitions are abstracted from the Institute of Scrap Recycling Industries' (ISRI) Scrap Specifications Circular 1988. The 49 grades and 31 specialty grades in this circular have been condensed into the five groupings listed below.

Mixed Papers: Mixed papers, super mixed papers, boxboard cuttings, mill wrappers, specialty grades. ISRI grades 1-5 and 1S-31S.

Newspapers: Old newspapers, special news (including deink quality) over-issue news, white blank news, groundwood computer printout, publication blanks, mixed groundwood and flyleaf shavings, coated groundwood sections. ISRI grades 6-9, 22-27, 44.

Corrugated: Old containers both corrugated and solid fiber, container plant cuttings. ISRI grades 10-14.

Pulp Substitutes and High Grade Deinking: Includes ledger, tabulating cards, bleached sulfate shavings (unless used as a news substitute). Envelope and bleached sulfite and sulfate cuttings, coated book stock, computer printout, kraft paper and bags and all other grades not classified above. Print free grades are reported as Pulp Substitutes and printed grades, if deinked, are reported as High Grade Deinking. ISRI grades 15-21, 28-43, 45-49.